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THE relation between foreign upsets and agitations and American railway investment should be noted. Within a few weeks there has been a revolution in Portugal; a cabinet crisis in France; acute Socialist disturbances in Germany; and now there approaches in England a new general election succeeding one only ten months ago and bearing on an issue that strikes down to the very roots of the British constitution. To the mind of the foreign investor governmental stability bulks big. Under conditions of governmental disturbance national securities —even English consols—fall, and the investor's eye from over the sea looks abroad to such securities as those of the American railway for placing his funds. Must it not then be regarded as peculiarly unfortunate and untimely just at such a juncture when our best railway companies are ready with new loans bulwarked behind great equities in dividends that the foreign investor finds them shadowed by the frictions, not to say collisions, with federal and state authority? The foreign market which, under normal conditions, would be opening broadly for our securities with corresponding reduction of the price of the loan—that is to say, the rate of interest—either open narrowly or only in response to a high interest rate. All American securities suffer in such a case, but those of our railways suffer peculiarly, because long ago the judgment of the foreign investor, confirmed by experience, singled out the dividend paying American railway as a kind of emblem of financial conservatism—certainly so as to its bonds.

THE state railway commissioners, at their convention in Washington last week, again tackled the question of railway safety, but they did not treat it as they did last year. The notable feature of the discussion was the evidence it furnished of a more intelligent and earnest demand for the introduction of the block system. The more progressive of the members clearly see that this radical improvement is needed on the electric as well as on steam railways. The lessons of the horrible collisions on interurban lines during the past few months have not been entirely wasted. The discussion of the very poor management and discipline that is to be found on many interurban lines showed that the commissioners most interested are awake to the situation. The direct and vigorous language on this subject which is quoted in our report seems to have been fully warranted. The regrettable thing about this part of the discussion is that some of the speakers seem to have thought that if good trainmen were secured and suitable discipline enforced the collisions would be prevented; whereas the cold fact, as shown by all past experience, is that even with the best force of men that can be had there is still the necessity for the block system. Not only the men but the methods are faulty. The steam railways have learned this, and the electrics and the commissioners will have to learn it—if they have not already done so. As to automatic stops, the action of the convention was ambiguous—so much so that, probably, it does not amount to anything. The committee said that "this association should pass resolutions at this meeting calling on Congress to take prompt action for the compulsory use of automatic control of trains." But no resolution was passed, and the action of the meeting on block signaling generally was in consonance with the views of the members who counseled a moderate course, quite different from the radical ideas of the committee; yet the report as a whole was "adopted," with this revolutionary paragraph still in it. The absurdity of passing a law to require the use of automatic stops, a comparatively new safeguard, when a law requiring the use of the block system, a well tested safeguard, is still waiting to be acted on, and has waited five years, will be apparent to anyone who considers the subject, even superficially.

FROM now on the gayety of the Interstate Commerce Commission's hearings on freight rate advances will never flag, for Mr. Brandeis, who has been retained by certain shippers, is going to show how the railways can save money so fast, by shop economies, that any increase of expenses due to heavier payrolls and the higher cost of raw materials will seem a mere bagatelle. In other words, such economies as have been introduced in shops by piece work, high speed tools and the like can be used with equal effect in all departments of railways; and Mr.

Brandeis is going to tell how to do it. He gave the press 2,500 words on the subject when the hearing opened, but he did not at that time get down to particulars; these will come later. Insofar as the slower railways ought to imitate the methods of the more progressive ones Mr. Brandeis is on solid ground; but he will find that he has coupled on to a pretty long string of "battleships" nevertheless. In the first place a governmental body like the commisison, or a court, cannot hold the railways up to such high standards, howsoever desirable it may be to establish them. The courts, when they lay down "the state of the art" in any line of endeavor are decidedly conservative; far too conservative, Mr. Brandeis will find. Again manufacturers, whose skill in effecting economies he holds up for imitation, are free to pay 25 or 50 per cent. dividends—and often do pay them. That is an incentive; but the shippers would limit the railways to 6 per cent. If the lawyers simply want to "impress the jury" the railways can follow the same lines; for the railways' record as a whole is one of really brilliant economy; for the savings that have been made by the use of powerful locomotives, large cars and other improvements in that line will evoke the admiration even of Mr. Brandeis, if he examines the record. However, as we have said, there is a prospect of a lively discussion.

RAILWAY BUSINESS ASSOCIATION DINNER.

THE question of regulation of railways is a public question in the broadest sense. The only criterion of what ought or ought not be done is the probable effect on the public welfare. That recognition of this principle is emerging is illustrated by the annual report of the executive committee of the Railway Business Association, and by addresses delivered by John Claflin, Daniel Willard and Chairman Knapp, of the Interstate Commerce Commission, at the annual dinner of the Railway Business Association, abstracts of which are published elsewhere in this issue. Mr. Claflin is one of the largest shippers of dry goods in the United States, Mr. Willard is president of a great railway, and the Railway Business Association is an organization of makers of and dealers in railway supplies; yet they, while touching on the respective special interests of the large industries they represent, were not behind even Chairman Knapp in contending that in the settlement of the question of railway regulation all other interest ought to be subordinated to those of the public. Mr. Claflin frankly conceded that in the public interest there ought to be some advance in railway rates, and showed how, while the direct effect of this would be to make the shippers pay more for transportation, the indirect effect would be to cause an increase in the prosperity of the country by which the dry goods merchant would gain more than he would lose through higher rates. Mr. Willard just as candidly conceded the necessity for government regulation of railways and asked only that it should be conceived and carried out in a spirit of fairness and with an eye single to the general welfare. Mr. Knapp, in virtue not only of his official position, but also of the impartiality, ability and patriotism with which he has performed its duties, with good right spoke for the public and pointed out that the railways must be allowed to have adequate earnings to enable them to do three things: first, to earn such a return as will attract adequate new capital into them; second, to pay liberal wages to an adequate number of competent men; and, third, to make proper improvements out of earnings, which will have the effect at once of increasing the value and usefulness of railway service to the public and of preventing an undue increase of railway capitalization.

Unfortunately, it is easier to express high and correct ideals in post-prandial speeches than to get men to keep such ideals before them and try to live up to them when they come to dealing with practical, irksome, every-day affairs, for at the banquet table the struggles of seemingly incompatible commercial interests cease from troubling, and the spirit of unintelligent selfishness is at rest. But just the same, such dinners and such speeches do good. They raise ideals to aim at, and those who raise and aim at high ideals are pretty sure to be and do better, even though afterwards they sometimes temporarily forget them, than those who never conceive and aim at them at all. One of the main things that have got shippers, communities, railways and regulating authorities at loggerheads and brought some into disrepute has been that they have failed to formulate correct ideals and principles for their own guidance. The railway managers, for example, up to a few years ago, simply carried on their business as did other men in commercial pursuits. They made such rates and provided such service as they thought were needful to move the traffic. The shippers and communities strove to get such rates and service as they thought would further their own particular interests. Many of the regulating authorities have issued orders and passed laws with very little regard to anything but the political interests of the commissioners and lawmakers. Any far-sighted man ought to have anticipated that this pulling at cross-purposes on the theory of "every man for himself and the devil take the hindmost" must ultimately result in a condition which would be intolerable to the public. But there are not many far-sighted people. So when the prophets of trouble prognosticated no man listened. But things have changed, and now if the principles discussed are not too abstract and the ideals too exalted they fall on amenable ears.

"When the devil was sick the devil a monk would be. When the devil was well the devil a monk was he." The existing public sentiment and industrial conditions are bringing about the more harmonious views and relations of the shippers, the railways, the regulating authorities and the public. The tide has turned, and probably it is a matter of but a short time until pretty satisfactory conditions and a pretty fair and reasonable public sentiment will prevail. How long after that will the various interests represented at the dinner of the Railway Business Association continue to try to create and maintain a reasonable public sentiment and to prevent the revival of past and strive for the abolition of existing abuses? The railway business is being more conscientiously and public-spiritedly managed now than ever before. Its worst evils have been unscrupulous financial manipulation and unfair discriminations in rates. There has been very little of the former for some years. There has been much less of the latter than in previous years. But some grossly unfair discriminations still exist. Are or are not unscrupulous financial manipulations to be revived? Are or are not the big shippers, the big communities, the railways and the regulating authorities going to co-operate to eliminate existing unfair discriminations? Have the big shippers enough public spirit and foresight voluntarily to give up some of the unfair advantages they have now, and if not, have the railways and the regulating authorities the good sense and courage forcibly to abolish them? In brief, are reforms connected with the transportation business to go on, or after public sentiment is conciliated are the shippers, the railways and the regulating authorities going to begin at once to provide fuel for some future day of public wrath?

We are inclined to think that the entire railway business and its relation with all other interests have not only been raised to, but will be kept on, a higher level than in the past, but when the pressure of adversity is removed the work of keeping them on a high and raising them to a higher level will become more difficult; it is easier for most people to be virtuous in poverty than in riches. That work will be made much more effective if all the interests directly concerned will continue to keep in thought and act as well as words the points of view which were so well expressed by their spokesmen at the Railway Business Association dinner.

SCREW SPIKES.

WE believe that screw spikes have not been adopted exclusively on any line in this country, the minor disadvantages and extra cost still preventing their general use. Numerous experiments have been made with the ordinary laboratory tensile testing machine on the resistance of screw spikes with threads of various shapes and proportions, but the results of such tests give maximum values and do not take account of the changed condition of the tie caused by constant exposure to the weather. A portable tensile testing machine, invented by Albert Collet, of Paris, is now being used on one of our western roads to measure the resistance of screw spikes of various designs as found in actual track conditions and in different kinds of wood.

The size and shape of the threads on screw spikes have become so much a matter of personal preference with the chief engineers that they are the despair of the manufacturer, and as a commercial matter it becomes important that screw spikes of a few standard sizes be adopted. The resistance offered by the screw spike depends so much on the kind and condition of the wood surrounding it that in any general discussion of the subject a distinction should be made between its used in soft wood ties and in hard wood ties. Its successful use abroad has been almost entirely with hard wood, and where used with soft wood ties resort is usually had to plugs of hard wood, either square or screwed into the tie. Objection is made to the latter because each requires a hole some 1¾ in. in diameter bored nearly through the tie, and this materially weakens the tie. Various disadvantages of this kind connected with the use of screw spikes in soft wood have led some of the foreign roads which have used them extensively to discontinue their use in soft ties.

The ordinary screw spike cannot be regarded as a satisfactory rail fastening for soft ties when used alone. The vertical holding power depends largely on the shearing strength of the wood engaged by the threads, the extent to which there is direct frictional resistance against the shank varying with different methods of driving and kind of wood. Repeated efforts are made to help out the spike with some supplementary device to increase the vertical bearing against the wood fibres. A steel spiral has been used for this purpose, and more recently a threaded split bushing made of malleable iron. One part of this bushing is made so that the thread of the screw spike tends to spread it, making it conical with the large end down. Another form which has been suggested by American experience has a flanged bushing inserted from the bottom of the tie and the spike is screwed into it. This method has the advantage of the flange resistance as well as that afforded by the threads in the tie itself.

The wood surrounding the screw spike is sometimes injured by carelessness in driving the spike, by splits, shrinkage, knots or other irregular structure in the tie itself, and the spike is not then an efficient fastening. It is possible, that in the further development of a substantial fastening for rails, the screw thread in its contact with wood may be entirely abandoned, and an ordinary plain bolt, with a standard machine thread, used instead. To meet the ordinary requirements of securing rigidly the rail and tie plate to the tie a plain bolt passing clear through the tie would be sufficient. A washer 3 in. square on the under side would provide an area of 9 sq. in., and would be adequate for safe working crushing pressure of 7,200 lb., taking 800 lb. per sq. in. as the allowable pressure on soft wood, and in this way a rigid fastening would be secured. A small bolt ⅝ in. in diameter would provide ample tensile strength, but on account of corrosion—and especially the small area for lateral thrust against the wood—it would be advisable to use a ⅞-in. bolt. The principal objection to such construction is the difficulty of removal for repairs, but the use of bolts for rail and tie fastenings is not entirely without precedent, as they are used on all forms of metal ties.

During the past 12 years a satisfactory fastening between rails and soft wood ties—especially in connection with tie plates—has been the subject of continuous experiment on the Prussian state railways, and the latest conclusions emphasize the importance of a rigid fastening to prevent wear. To secure this they have made a form of tie plate which is bolted to the rail, and the plate is then secured to the tie with four screw spikes. The Great Western Railway of England uses for a rail fastener bolts passing entirely through the tie in the manner we have indicated, but in this case the chairs are fitted and bolted to the ties before they are laid.

In thus commenting on the tendencies in the use of screw spikes we have not lost sight of their great superiority over the square spike and their great value in hard wood ties.

THE SURVIVAL OF THE EXHAUST BRIDGE.

THE resort to homely and familiar remedies in time of stress or necessity is a natural tendency in mechanics as well as in medicine. There are numerous illustrations of this in locomotive practice, and one of the most recent is the return to the exhaust bridge as a means of making a locomotive steam freely when the ordinary standard appliances fail to produce the desired result. We have referred to standard draft appliances, but find that the Master Mechanics' Association has not adopted the designs and proportions for nozzles and stacks, as recommended in the reports of 1896 and 1906, either as standards or recommended practice. However, those proportions were presented with such a weight of authority, as the result of most elaborate experiments, that they have become generally recognized as standards and are in use on the majority of locomotives. The report of 1896 was concerned principally with the shape and size of exhaust nozzles, and the work included experiments made to ascertain the effect of bars or spreads placed across the nozzle opening; with a 14-in. choke stack, the top of the nozzle was 43 in. from the choke. The bars were made of ⅜-in. and ½-in. round iron; also of brass, triangular in cross section, the apex of the triangle being downward. After repeated tests with these cross bars or bridges on the exhaust nozzle at its outlet, the report concludes that it is not advantageous to increase the enfolding action of the jet at the expense of the induced action, or, in other words, that the more solid the jet of steam, within the limits of the experiments, the more efficient it is as a draft producer. In the general conclusions of the same report, one item states that the efficiency of the jet is reduced by spreading it by means of cross bars in the nozzle, and another item states that cross bars increase the back pressure in proportion to their width. This report was so positive in condemning the bridge in the exhaust nozzle that the subsequent experiments with stacks and nozzles made for the Master Mechanics' Association did not include any reference to it. The exhaust bridge has, for the reasons given, become regarded as bad practice and only to be used as a homely remedy in case of dire necessity.

Notwithstanding this bad reputation, it is interesting to observe the persistence of an effectual appliance and surprising to find that the exhaust bridge is now in general use on the large new locomotives of half a dozen of the principal lines in the West, and, doubtless, in the East, wherever the large diameter smokebox has compelled the use of a very short outside stack. In its present use it takes the form of a ¾-in. round bolt which is placed in the nozzle near its top; in some instances the nozzle is given an outside flare at this point, with the apparent idea of giving the exhaust steam a chance to spread immediately on leaving the nozzle or else to provide an area of opening at the bolt equal to that of an unobstructed nozzle. The action of the bridge in spreading the exhaust is shown in the more rapid wear of the draft pipe and stack at points parallel with the sides of the bolt or bridge. It is this spreading that causes the exhaust jet to fill the stack lower down and thus produce a stronger draft on the fire.

The experiments in 1896 were made with an outside stack longer than the diameter of the smokebox, while at present the clearance limitations require the outside stack to be only about

one-fourth the diameter of the large smokeboxes; the result is that the inside stack is much longer than the outside one, and its relation to the tubes is very different. The stacks are now much larger in diameter. In fact, conditions generally have changed so much that it can hardly be claimed that the early work on exhaust nozzles properly applies to present practice. The difficulty that is now found in making large locomotives with short stacks steam freely would indicate that the ordinary form of nozzle is not sufficient, and the subject cannot be regarded as having reached a final settlement. The search for a satisfactory variable exhaust, which is in very general use on foreign railways, would indicate this, and, if we may so term it, the surreptitious use of the exhaust bridge is spreading so rapidly that it may presently be found an established standard. While it may be true that the proportions recommended in the 1906 Master Mechanics' report apply equally well to the very short stacks, there must be something wrong with their application and maintenance, or it would not be necessary to resort to methods which may not be best in their relation to fuel economy. It is possible that the inside stack is not as substantial as it should be, or its fastenings as secure, and it is not so easy to observe whether it is always in true alinement. It is well known that even a slightly cracked stack interferes materially with good draft, and it may be that the exhaust bridge has been introduced to help out the deficiencies of inside stack construction.

That an artificial spreader for the exhaust is not altogether a bad thing is seen in the design of the variable exhaust of French locomotives, where there is a supplementary bronze tip inside the exhaust proper, which can be raised or lowered. In its highest position it permits the steam to escape only through its center, which is arranged with three spiral-shaped vanes giving the escaping steam a whirling motion. When the tip is lowered, however, an outlet is given around its exterior surface and a cylindrical shaped jet of steam escapes around the inner whirling jet. The whirling motion given to the exhaust will permit it to fill a larger stack than if straight, and will also tend to extinguish sparks by throwing them against the sides as they escape through the stack. Such devices, acting as spreaders, are effectual in making large engines steam freely, and if they produce such an amount of back pressure as to effect economical operation the extent of the fuel loss should be demonstrated. If resort must now be had to draft appliances different from the well-established practice, the fact should be recognized and the best designs obtained for present practice by further experiment.

NATIONAL RAILWAYS OF MEXICO.

IT is possible to trace clearly in the operations of the National Railways of Mexico for the fiscal year ended June 30, 1910, the economies and benefits that have resulted from the merger of the Mexican Central and the National Railroad of Mexico, and the taking over of various other Mexican lines. For instance, under conducting transportation, the cost of superintendence was less in 1910 by $50,000* than in 1909. Miscellaneous expenses were $17,000 in 1910, as compared with $106,000 in 1909. Gross earnings totaled $26,300,000, 1910, as against $24,400,000 in 1909, and total operating expenses amounted to $15,800,000 last year and to $14,600,000 the year before, while the cost of conducting transportation was $7,500,000, an increase of about $280,000 over 1909. In other words, while maintenance of way consumed 15.71 per cent. of gross earnings in 1910, as against 13.47 in 1909, and maintenance of equipment consumed 12.25 per cent., as againsst 12.69 per cent., conducting transportation consumed but 28.61 per cent., as against 29.65 per cent.

*U. S. Gold. All figures in these comments are reduced to U. S. currency, the Mexican dollar being taken at 50 cents.

After the payment of expenses, taxes and interest, and setting aside reserves, the National Railways of Mexico had a balance of $1,400,000 and paid 3 per cent. dividends on the first preferred stock, setting aside also 5 per cent. of net profits transferred to reserve fund. These transactions left a net surplus of $480,000. In 1909 the balance available for dividends was $650,000, and 2 per cent. dividends were paid on the first preferred stock, leaving as net surplus the nominal sum of $25,000. The results in 1910, the second year of the new company, and, as a matter of fact, the first full year of operation of the combined roads under the new management, make a distinctly good showing.

In traffic statistics, as well as in the figures for earnings and expenses, the changes due to the operation under a single management of formerly separate roads, are traceable. The average haul of freight in 1910 was 356 miles, as against 346 miles in 1909. The average haul per passenger was 68.85 miles in 1910, as against 57.75 miles in 1909. In September, 1909—that is, in the first part of the last fiscal year—there were very severe floods in the Monterey district. It is estimated that in places as much as twelve inches of water fell in thirty-six hours. Debris formed a dam against the bridge across the Monterey river so that the water backed up behind it and eventually flooded a great part of the surrounding country. The results of this flood were to increase greatly expenses for maintenance of way and structures, and the closing of this line also hindered in many ways the economical operation of other lines not directly affected. Under maintenance of way and structures there is charged in 1910 $390,000 for extraordinary repairs. Advantage has been taken of the necessity for building new lines in Monterey to make a considerable improvement over the condition of the old lines by changes of line, raising grades and putting in permanent steel and masonry. It is estimated that, of the final cost, $650,000 of these expenses will be chargeable to additions and betterments (capital account), and the balance, $950,000, represents the approximate cost of replacing previous structures. A reserve fund of $500,000 has been taken out of this year's income to pay for the work under this head which is chargeable to operations.

In 1910 the total number of tons of revenue freight carried amounted to 5,711,951; in 1909, 5,707,972 tons were carried. But since the average haul of freight was much longer in 1910 than in 1909, the ton mileage was considerably greater last year than the year before. The National Railways earn a high ton mile rate, but a low passenger mile rate. Last year the average receipts per ton mile were 1.488 cents, which is greater by 4.81 per cent. than the average receipts in 1909. The average receipts per passenger per mile were 1.135 cents, which is greater by 1.28 per cent. than in 1909.

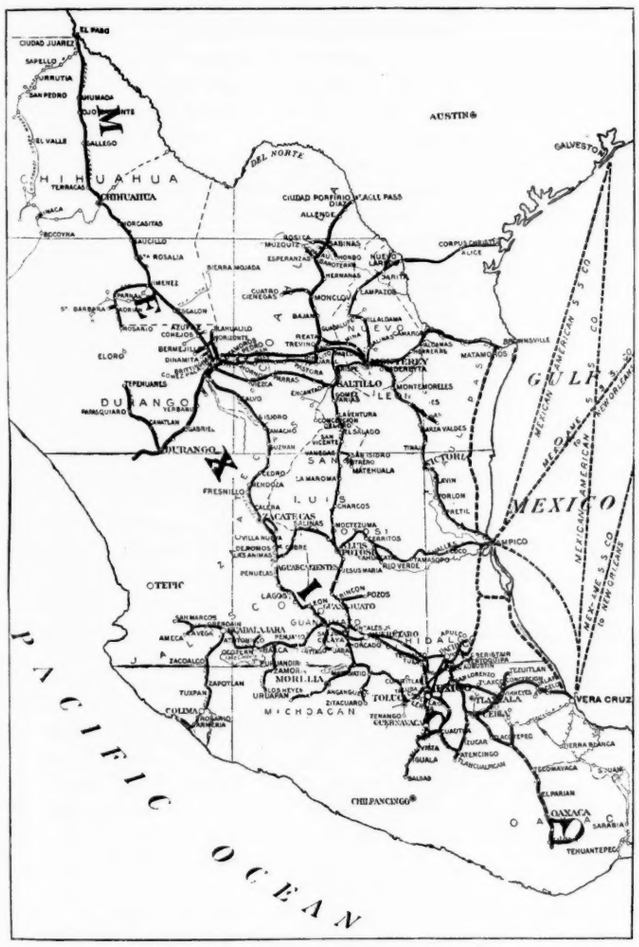
Of the total 5,711,931 tons of freight carried last year, 49 per cent. was mineral products, 23 per cent. agricultural products, 12 per cent. products of forests, 12 per cent. general merchandise, and about 3½ per cent. live stock and animal products. The tonnage of ores is a very important item in the traffic of Mexican roads. In 1909 there were 1,226,724 tons of ore carried; in 1909 there were 1,361,166 tons. This falling off in ore tonnage may be accounted for by the low price of metals during the past year. As the price rapidly declined, certain mines had to curtail their output greatly, and in some cases entirely close down; but, as is so often the case under such circumstances, the necessity for economies in cost of production resulted in a slowly increasing amount produced per unit of expenditure. The price of silver has recently gone up, and in the present year the prospects for the larger tonnage of ore are good. Under the heading general merchandise it is interesting to note that the tonnage of hardware, nails, etc., which amounted in 1909 to 73,782 tons, had increased in 1910 to 132,237 tons.

The decrease in the proportion of low grade tonnage possibly accounts in part for the smaller train load. The average train load in 1909 was 292 tons on the standard gage lines and 109 tons on the narrow gage lines; in 1910 the train load on the standard gage lines was 283 tons and on the narrow

gage lines 102 tons. Car-loading also in 1910 was slightly under that of 1909.

The National Railways have a comparatively light freight density. There were 150,224 tons of freight carried one mile per mile of line in 1910.

In the review of the first annual report of this company, published in these columns last year, the financial changes that had taken place in the readjustment were commented on at some length. It will be recalled that holders of securities of the National Railroad of Mexico and the Mexican Central were asked to deposit their stock and bonds and receive in exchange securities in the new company, the National Railways of Mexico. One great advantage gained by the merger is that the company now has mortgages under which comprehensive and consistent financing of betterment and additions and of purchase of new lines can be carried on. Another



National Railways of Mexico System.

advantage of the plan of merger is that under this plan securities issued under the new company's general mortgage are guaranteed by the Mexican government. The capitalization of the new company is high; but the issue of $74,800,000 common stock (nearly all of this stock going to the Mexican government) on which there is no present prospect of earning any dividend is defensible, insofar as it offered a satisfactory way for the Mexican government to extend its credit to the National Railways, and in exchange to gain a controlling interest in the management of the principal railways of Mexico. The Mexican government owns $10,000,000 first preferred and $30,278,290 second preferred, which, together with its common stock, gives it $115,023,590 stock out of the total $230,000,000 authorized stock.

There were no securities sold during the year, and the only new securities put out during the year were those issued to retire securities of the old companies deposited under the plan. In this connection there is a rather curious fact brought out by the annual report for 1910. While 99.73 per cent. of all the securities of the National Railroad of Mexico, and 97.44 per cent. of all the securities of the Mexican Central, have been deposited under the plan originally providing for the organization of the National Railways of Mexico, over 21 per cent. of the priority 5 per cent. bonds of the Mexican Central have not as yet been deposited. As a matter of fact, less than $20,000 of these priority bonds were deposited during the year. There does not seem to be any definite reason for this. There was no objection whatsoever on the part of the holders of these bonds to putting the plan of organization of the new company into operation; and under the plan they received not only a higher par value of securities by exchanging their priority bonds, but also a higher rate of interest; and what seems to be an equally good lien on the property. The bonds are, of course, not registered, and presumably in a great number of cases the company is unable to trace the holders of these bonds and is unable to learn their reason for not making the exchange.

The balance sheet of June 30, 1910, shows cash on hand of $7,800,000, including $3,750,000 deposited for payment of coupon interest. At the end of 1909 there was $15,600,000 cash on hand, including $3,000,000 for the payment of coupon interest. In 1910 total accounts payable amounted to $5,550,000, which included $1,850,000 notes payable. There were no notes payable in 1909; and total accounts payable amounted to $1,800,000. During the year $1,650,000 was spent on capital account, exclusive of additions and betterments; and since June 30, 1908, $2,150,000 has been spent for additions and betterments. The benefits of these expenditures in 1909 and 1910 for betterment work are not shown in the 1910 report; the economies resulting from these betterments should be much more apparent in the current year.

When the Mexican Central and the National Railroad of Mexico were merged, the property of the National Railroad was in comparatively better shape than that of the Mexican Central, and the greater part of the expenditures for betterments by the new company have been to bring the Mexican Central lines up to the standard of the National Railroad. A large amount of work has been done relaying track with heavier rail. In general, 56-lb. and 70-lb. rail has replaced 40-lb. rail; and 85-lb. rail has replaced 70-lb. rail. The cost of the increased weight of rail laid in 1910 amounted to $293,500. and the cost of ballasting track that has not had ballast before amounted to $250,000.

The National Railways of Mexico now includes all of the important lines in Mexico, with the exception of the Southern Pacific lines in Mexico on the west coast. The Mexican International, control of which was formerly owned by the Southern Pacific, has been bought by the National Railways, which now own 203,023 out of a total of 207,082 shares; and the property of the Mexican International has been transferred by a deed dated June 30, 1910, to the National Railways. The property of the Mexican Pacific, heretofore controlled through stock ownership, has been transferred through a deed to the National Railways. Since the close of the fiscal year the company has also bought control of the Pan-American Railroad and of the Vera Cruz & Isthmus; and it is estimated by the company that these new acquisitions will, in the near future, earn sufficient to fully cover the expenses of operation, as well as fixed charges. Through the control of the Interoceanic, which in turn controls the Mexican Southern, the National Railways have an entrance into the State of Oaxaca. Another step in the expansion and development of the Mexican lines has been the formation of a company, half of the common stock of which is owned by the National Railways and half by the St. Louis, Brownsville & Mexico, to build a bridge across the Rio Grande at Brownsville.

There are many indications throughout the 1910 annual re-

port that an effort is being made to make the Mexican railways a national undertaking, and as far as possible to have the management and operation largely in the hands of Mexicans.

In the formation of a local New York board of directors, it was generally understood that a majority of these New York directors represented the Mexican government. Last year the conductors and enginemen of foreign nationality, mostly from the states, tried to obtain certain advantages in conditions of service, etc., over Mexicans occupying similar positions, and a general strike was threatened. The report says: "The board of directors worked energetically, and by exercising necessary prudence was able to handle the situation in such a way as not only to satisfy the conductors and engineers mentioned, but to uphold the principle of giving preference to the Mexican employees under equal circumstances. This was in accordance with the regulation in effect that foreign employees who properly performed their duties would be kept in the service, thus recognizing their personal merits; the understanding being that, under equal conditions, preference would be given to native employees, with a view to stimulating the native element, so that in course of time the company would be able to use native employees in its service as far as possible."

The express service on the National lines has been reorganized. At the time of the merger, Wells-Fargo & Co operated over the Mexican Central, and the National Express Company over the National Railroad. A company under the name Compania Méxicana de Express has been organized to perform the express service over the entire system. The National Railways receive 50 per cent. of the gross earnings in payment for providing facilities for the service. The total capital stock of the express company was paid in in cash by Wells-Fargo & Co. and amounted to $500,000. The stock was divided into two equal series, A and B, and all of the $250,000 A series was given to the National Railways. Both series A and B stock bear 9 per cent. cumulative dividends; but the dividends on the A stock must be paid before payment is made on the B stock. After payment of 9 per cent. on both series, the balance is payable pro rata on the entire stock. This is a more advantageous arrangement from the railway's point of view than usually obtains between an express company and a railway company.

The following table shows the operations of the company in 1910, compared with 1909:

	1910.	1909.
Average mileage operated	5,262	5,227
Freight revenue	$18,935,682	$17,536,156
Passenger revenue	6,610,886	6,187,778
Total operating revenue	26,281,147	24,402,761
Maint. of way and structures	4,128,909	3,287,416
Maintenance of equipment	3,219,112	3,095,885
*Transportation	7,518,762	7,234,607
Total operating expenses	15,796,779	14,583,440
Taxes	182,996	139,294
Operating income	10,301,372	9,680,027
Gross corporate income	10,895,640	10,373,074
Net corporate income†	1,418,285	633,572
Dividends	864,987	576,658
Surplus	553,298	56,914

*Includes Traffic expenses.
†After the deduction of $1,045,826 in 1910 for reserves for flood damage and for depreciation of equipment and for adjustments, and in 1909 $620,200 for depreciation of equipment.

NEW BOOKS

The Polytechnic Engineer.—Published annually by the undergraduates of the Polytechnic Institute of Brooklyn, N. Y. Vol. X. 144 pages, 6 in. x 9 in. Price, $1.50.

This publication, essentially of interest and value to the graduates and undergraduates of the institution with which they are associated, contains the results of the best research work and the best papers delivered before the technical societies of the institute during the past collegiate year. Such publications usually contain articles of much value, being written by men whose interests have been centered on the particular subjects for some time, either in a business connection, or through undergraduate research work. The material in this publication shows earnest endeavor; it is both interesting and valuable.

TRANSPORTATION AND TRAFFIC IN ENGLAND.*

BY LOGAN G. M'PHERSON.

I.

The area of England and Wales is 58,324 miles, almost exactly that of the state of Georgia. This is over 20,000 miles less than the extent of the region tributary to the Rhine. Physically, England and Wales consist of seven basins separated one from another by watersheds that at places are pronounced and in others inconsiderable elevations. It is therefore evident that, as a rule, the 215 rivers that find their way to the coast on one side or another cannot come from very far in the interior, only the Thames, the Severn and the Trent extending from the Midlands. Although the rivers generally traverse level plains or broad valleys, only six of them are navigable for more than 50 miles of their lengths; others are navigable for greater or lesser distances, and a few in their lower reaches are estuaries of the sea. The first settlements of economic importance were naturally at or near the heads of navigation of such estuaries. Thus London owed its wealth and prosperity to the Thames, Bristol to the Severn and the Avon, while Norwich on the Yare had easy access to the sea. York, on the Ouse, had direct communication by water for many miles in nearly every direction with the surrounding country, and Exeter by way of the river Exe obtained connection with the English Channel.

The earliest landways were the Roman roads, leading in the main from a port on one side toward a port on another side of the country; that is, they extended from Dover through London to Chester, from London to Exeter, from Bath to Lincoln and from Manchester to Newcastle, taking substantially the same routes as those of the great railway lines subsequently constructed. After the Romans withdrew from the island, it would not seem that these highways were well maintained, for all accounts of communication during the medieval period dwell on the wretchedness of the roads. Much of the interior was forest, bog and fen. While the feudal lords accepted a certain responsibility for the condition of the roads, they did not bestow a great deal of effort on them. A statute of Henry VIII bound each county to repair the bridges of public utility within its limits, and an act of Philip and Mary provided for the election by the parishes of surveyors to see to the maintenance and repair of the highways leading to market towns. The local parishes as a rule, however, had no funds at their disposition for such repair, and throughout the middle ages goods were chiefly carried by packhorses, who traveled along the bridle paths which in many parts of the country were the only roads, while travelers mostly journeyed on horseback. Even in the middle of the seventeenth century, packhorses, strong enduring animals, the breed of which is now extinct, were employed to carry the products of the looms, the pottery of Staffordshire and even the coals of Newcastle.

In the Saxon era each of the separate counties was very much cut off from its neighbors, obtaining food and clothing from its own flocks and herds and from its own land. In addition to the towns that had grown up at the heads of navigation on the various rivers and estuaries, smaller settlements arose in fortified camps or in the shadow of a great abbey or monastery, as did Oxford, or around the country house of some king or earl.

The beginnings of that industry which ministers to the wants of those beyond the immediate neighborhood are rooted in the fact that the soil and the climate of England are especially adapted to the growing of sheep. At least as early as the thirteenth century wool was exported to Flanders and later to Holland and to Italy. During the reign of Edward III Flemish weavers came to England and established the looms from which the first woolen goods of this country were made. The growth of the industry was facilitated by the fact that England was incomparably more peaceful than the countries of Western

*From a preliminary report to the National Waterways Commission of the United States.

Europe. Between the thirteenth and the seventeenth centuries the lands of the Continent were so continually devastated by war that the farmers could not possibly have kept sheep, the most tender and defenseless of domestic animals.

The development of the wool industry and progress in agriculture naturally tending to break down the barriers of local self-sufficiency led to the exchange of merchandise between one place and another, especially at fairs which were held annually in different parts of the kingdom, and were attended by all classes of the population. The largest fairs were at places near the water where could readily be received the goods of other lands. Here came Flemish merchants with their linen and cloth; Frenchmen and Spaniards with their wine; traders from Venice with silks, velvets and precious stones; Norwegian sailors with tar and pitch; the emissaries of the Hanseatic League with furs and amber, iron and copper, flax, fustian, buckram, wax and spices and ornaments from the East. In return the English farmers sold wool, barley, corn, horses, cattle, lead and tin. The principal mercantile event was the visit of the Venetian fleet to the southern shores. Small light boats plied back and forth, carrying wool between England and Flanders.

Throughout all this period, which extended well into the eighteenth century, the commerce of England with other countries was conducted mainly by the regions adjoining the coast or bordering the estuaries. Domestic commerce was also carried by coastwise vessels between one port and another. In the communication between place and place in the interior, peddlers and packhorses were still the principal factor.

There had, however, been a certain improvement in the landways. The first real effort dated from the passing of the Turnpike Act in 1633. The first turnpike tollgates were not erected until during the reign of Charles II, and they did not come into general use until a hundred years later. Coaches had been introduced in 1553, but not until 1658 was a stagecoach line established between London and Edinburgh, the journey taking nearly a fortnight. In 1669 the stagecoach undertook to perform the journey from Oxford to London between the rising and the setting of the sun.

The landways, however, did not keep pace with the needs of the growing traffic. The wool industry founded by the Flemish weavers had become well established, a body of Italians skilled in handiwork came to England toward the end of the fifteenth century, and many Protestants, driven out of the Netherlands by the Duke of Alva, found refuge here during the reign of Elizabeth. The expulsion of the Huguenots from France likewise caused a great wave of emigration of silkworkers and linen workers to this country. The woods and forests which once covered much of England were being recklessly used up; there was progress in agriculture, and attention was being given to the utilization of ore from the veins of iron, tin and lead, as well as to the more extended use of coal. Although this fuel had been mined in Newcastle during the thirteenth century it hardly entered the markets until four hundred years later, it being difficult of conveyance except by water, and barges could not go up the rivers except for short distances. The same was true of iron and the other minerals, as well as with the products of the pottery industry which was gradually developing. At the beginning of the sixteenth century the eastern and southern counties were the most prosperous, their wealth being based largely on agriculture, which was here all the more successful because the level land offered fewer obstructions to making and maintaining roads than did the uneven interior. But in the reign of Elizabeth was completed the transition of England from a wool exporting to a wool manufacturing country, the manufacturing population spreading over the towns and the country. This led to the North becoming even more prosperous than the South. Merchants and artisans of Antwerp, which had suffered severely under the Spanish invasion, fled to England, where they were welcomed and encouraged to continue in their vocations. London took the foremost position as the general mart of Europe, where the new treasures of the two Americas were found side by side with the products of the Continent and the East.

IMPROVEMENTS TO WATERWAYS.

Improvement of the rivers was begun in the fifteenth century, when the Thames, the Lee and the Yorkshire Ouse received some attention. In the sixteenth century the Severn, the Stour in Essex, the Humber, the Exe, the Lee, and the Welland were improved; in the seventeenth century the Colne, the Itchen, the Warwick, the Avon, the Medway, the Wye, the Bure, the Yare, the Waveney, the Suffolk Ouse, the Witham, the Aire and the Calder, the Trent and the Fossdyke; in the eighteenth century the Avon, the Dee, the Derwent, the Nene, the Kennet, the Weir, the Mersey, the Irwell, and the Weaver. The artificially improved channels of rivers are designated as "navigations."

In the seventeenth century, to extend the area available for industry, the fens of Cambridgeshire and Hatfield Chase, almost constantly flooded by the rivers, were drained by specially constructed channels. In imitation of the Dutch, the salt marshes of Essex and the lowlands of Norfolk were banked against the sea. In the next century the use of water increased as power for factories, cornmills and clothmills and in connection with the blast furnaces. This development tended to take the industries of eastern counties to the shores of the rivers and the streams. About the middle of the eighteenth century the Duke of Bridgewater conceived the idea that coal from his collieries at Worsley could be conveyed more speedily and more economically to Manchester by the aid of a canal. The authority for its construction was granted by act of Parliament; it was built and made a practical thoroughfare by James Brindley, who brought it to completion in 1761. Prior to the opening of the canal the charge for carriage along the existing waterway was twelve shillings per ton and along the landways, forty shillings. The charge by canal was made six shillings, and the price of coal in Manchester at once fell one-half. The canal was extended to the Mersey, affording connection between Manchester and Liverpool and laying the foundation of the prosperity of this district. Before this communication by canal the woolen and cotton products of Manchester intended for export had been carried on horses' backs to the Severn, down which they were floated to Bristol, then the chief seaport on the western coast. After the opening of the canal the packhorses were taken off, and the export trade was centered in Liverpool. Here new harbors and docks were built, and this city outdistanced Bristol. The next canal was the Grand Trunk, connecting Liverpool and Hull, opening up the salt district of Cheshire and the pottery district of Staffordshire. Heretofore, of the materials used in the manufacture of pottery, flints had been brought from the southeastern ports to Hull and then up the Trent in boats, while the clay was brought from Devonshire and Cornwall by water up the Severn, being carried, from the points where water carriage ceased, on the backs of horses to the potteries; and the manufactured articles were returned for export by the same routes. The cost of carriage was enormous and consequently the expansion of the earthenware manufacture was checked. The same difficulties had hampered the carriage of salt, corn, coal, lime and ironstone. The Grand Trunk Canal was connected by the Trent with Nottingham, Newark, Gainsborough and Hull. Its effect was to reduce the cost of carriage of all articles by 75 per cent. The population of the districts served by it was trebled in 25 years, and the country was not more improved than the people. Other canals were built to connect the Severn and the towns of Wolverhampton and Kidderminster with Liverpool by way of the Grand Trunk Canal; to connect Oxford and London as well as with Birmingham, and to connect the mineral districts of Derbyshire with the Trent.

These canals were all built under the direction of James Brindley. Others were rapidly placed in the way of construction and completed, usually, with reasonable expedition. The Leeds

& Liverpool Canal connected the Irish sea at Liverpool with Leeds and the then populous district of Lancashire. Various coal fields and agricultural districts were connected by canal with adjacent rivers. The Rochdale Canal was built to connect Manchester with the Humber by way of the Aire and Calder Navigation. It has been said that $150,000,000 was spent on these canals and navigations. Since 1852 the Manchester Ship Canal is the only canal that has been constructed, although various minor improvements and extensions have been made.

Expenditure on the rivers, principally along the channels of tidal navigation, continued during later years. The Tyne has been made of a uniform depth of nearly 30 ft. from Newcastle to the coast, permitting great vessels to move between the Tyne ports and the sea, and the Severn had been made navigable up to Stourport.

Although it was possible to trace continuous lines of water communication between the principal commercial centers of England, such continuous lines were rarely through routes over which the same boat could be taken from one end to the other. There were great differences in the depth and width of different canals and great differences in the sizes of the locks, the through boats being limited to the size that could be taken by the smallest lock. There was also great expense incurred in keeping the canals that crossed the watersheds supplied with water, it being necessary to lift the boats to heights, in many cases, of over 400 ft. through a series of locks up to which water had to be pumped. The barges employed to carry goods often got aground. For many days during the summer the canals were closed because of drought, and in severe winters they were at times frozen over. Notwithstanding all their disadvantages, however, the means of transportation afforded by the canals were so vastly superior to those of the packhorses and the stage-coaches, even though the landways toward the close of the eighteenth century had been greatly improved by macadamizing, that they led to a great advance in the industry and commerce of the country. Mills and factories were drawn to their banks, and they facilitated the development of the interior.

There was from 1791 to 1794 a canal building mania. Over 100 canal acts were passed by Parliament before 1800. The value of canal companies shares in some cases rose to 100 times their nominal or par value, and enormous dividends were often paid. In many cases, however, even at this time, the waterways yielded unsatisfactory results and were allowed to fall into decay.

The canal companies enjoyed a virtual monopoly, and with that singular want of foresight which so often accompanies unrivaled success, abused their power and outraged their customers. They shipped as much or as little as suited them and how and when they pleased. They limited the quantity, they appointed the time, until the difficulties of transit became a public talk and the abuse of power a public trouble. The canal proprietors were dilatory to the public until they became dangerous to themselves.

The truth is that as the packhorses and wagons of the previous era did not keep pace with the increase of traffic so also did the canals and other waterways rapidly fall behind the demand of the industry and commerce that in their day received an unparalleled impetus.

In 1769, Arkwright had originated the water-frame; in 1770, James Hargreaves the spinning-jenny; in 1779, Crompton the mule-jenny; and in 1785 Arkwright took out a patent for improved carding, drawing and rolling machines. The invention of the spinning-jenny and mule led to the provision of more yarn than all the weavers in the kingdom could consume. The invention of the power loom restored the balance and thenceforward there was no artificial limit to the use of yarn in weaving. But all the horses in the country, whether they were employed on the roads or in drawing canal boats, could not possibly distribute, with reasonable economy, all the cloth which the manufacturers could produce. That is, production was limited by the lack of adequate means of distribution. Just at this time, in the closing years of the eighteenth century, production was further facilitated by the most momentous event in industrial history, the introduction of steam as a source of power. The stationary engine made possible large factories in the neighborhood of the coalfields, instead of small factories along the streams. Hence their migration to the vicinity of the coalbeds and a further tremendous advance in the productive capacity of interior and northern England. The application of steam to production was soon followed by the application of steam to locomotion. In the early years of the nineteenth century, those inventors who endeavored to utilize steam as a motive power on ordinary roads seemed much more likely to succeed than those who based their efforts on roads with rails. Steam engines and steam coaches were devised that actually ran upon the highways, but the roads were not sufficiently substantial to resist the weight of the heavy steam vehicles. It was soon found that adequate support could only be given by an especially constructed roadbed of exceptional solidity, and that frictional resistance was far less when the wheels ran on rails.

EARLY RAILWAYS.

A wooden railway existed in the neighborhood of Newcastle on Tyne prior to 1676, connecting a colliery with the river, and at the beginning of the nineteenth century several such coal railways were in existence, using horses as the motive power. The first line constructed especially for steam locomotion was that covering the 11 miles between Stockton and Darlington, in the county of Durham. Its opening on September 27, 1825, attracted slight attention beyond the immediate neighborhood. The London newspapers of the next week published short accounts, but these excited little comment. The greatest event in the history of the world since the battle of Waterloo was suffered to pass almost unnoticed.

At this time nearly 3,000 stage coaches were in operation in England, about one-half running in and out of London, and 100 mail-coaches. In the next dozen years this number was very largely diminished.

An article in the *Quarterly Review,* published soon after this event, said that the 75 canals constructed up to that time had cost on the average about $45,000 a mile, whereas the railway cost was about $25,000 a mile. The article went on to say that "the disadvantages of the canal are many. The frost at one season of the year entirely puts a stop to all conveyance of goods, and the drought at another renders it necessary to proceed with half cargo. The speed by which goods can be conveyed on a railway can be so regulated as to be certain and constant, while boats are frequently delayed for hours at the lockages of a canal. Railways may be made to branch out in every direction to accommodate the traffic in the country, whatever be the nature of the surface, while the possibility of carrying branches from a canal in any direction must depend entirely on the surface and the supply of water. Experiment has shown that at the speed of two miles an hour, under the same moving force on a turnpike road, on a canal and on a railway, the canal has the advantage of the turnpike as 15 to 1, and of the railway as 2 to 1; at the speed of 2.82 miles, the railway and the canal will be found to be equal, but at the rate of three miles an hour the railway has obtained the advantage over the canal in the ratio of 22.4 to 19.9, and at nine miles an hour the canal can take only ⅛ of the weight conveyed on a railway with the same power."

The first considerable undertaking was that of a railway between Liverpool and Manchester, where the traffic had peculiarly suffered because of the inadequacy of canal transportation and the high-handed methods of the canal proprietors. After the first proposition the project was abandoned temporarily because of the engineering difficulties and partly because the opposition of the landowners was excited by the canal owners. These at last made a reduction in their charges, but it was too late. The merchants of Liverpool and Manchester came to a final deter-

mination to build a railway at an estimated expense of $2,000,000. The coach-owners were fearful of the prospects which opened before them, and the canal interests were in great confusion.

"They brought every influence to bear to thwart the plans. Every report which could promote a prejudice, every rumor which could affect a principle was spread. The country gentleman was told that the smoke would kill the birds as they passed over the locomotive. The public was informed that the weight of the engine would prevent its moving, and the manufacturer was told that the sparks from its chimney would burn his goods. The passenger was frightened by the assertion that life and limb would be endangered. Elderly gentlemen were tortured with the notion that they would be run over. Ladies were alarmed at the thought that their horses would take fright. Foxes and pheasants were to cease in the neighborhood of a railway. The race of horses was to be extinguished. Farmers were possessed with the idea that oats and hay would no more be marketable produce, cattle would start and throw their riders; cows even, it was said, would cease to yield their milk in the neighborhood of one of these infernal machines."

The second attempt to obtain the Parliamentary act for the Liverpool & Manchester Railway was successful, and the directorate was composed of men of the first importance. While this railway was thus incipient, many other lines were surveyed and some of them attempted, covering nearly all the routes subsequently occupied by the great lines.

In 1830 the London & Brighton Railway was proposed for the second time, meeting with a reception whose warmth was in decided contrast with the hostility previously manifested towards the Liverpool & Manchester. It was not, however, without a certain measure of opposition, voiced by men who vociferated objections quite as exaggerated and preposterous as those which had been made against the Manchester line. Moreover, extortionate demands were made on the railways and advantage taken of every trifling want.

A first attempt to build a line from London to Reading was unsuccessful, but a second effort, including the extension to Bath and Bristol, resulted in a charter from Parliament, and in 1841 it was opened for traffic. In 1832 a line from London to Southampton was projected, the act of incorporation receiving royal assent in July, 1834. The project for a railway between London and Brighton brought on a fierce fight, during which five separate lines were proposed, the sums spent by the various companies in endeavoring to obtain an act of Parliament aggregating nearly $1,000,000. The London & Essex Railway, proposed in 1831, was again brought forward in 1834, and at about the same time lines were projected to Edinburgh.

All the English railways were constructed by private enterprise, each under a particular act of Parliament. In the years 1836 and 1837 there was a railway mania, there being scarcely a practicable line between any two considerable places that was not embraced in the prospectus of one or another company. There were promoters who resorted to all kinds of tricks to get capital, and the parliamentary expenses were extraordinary. In one case $500,000 was spent without any result; in another, six counsel and twenty solicitors were employed at an expense of $335,000. The promoters of the London & Birmingham Railway spent $360,000, and the promoters of the Great Western Railway, $440,000, in forcing their schemes through Parliament. Of the whole capital of one railway, the London, Chatham & Dover, amounting to over $80,000,000, not less than $20,000,000 was dissipated in obtaining further subscriptions from the public and nearly $10,000,000 was disbursed out of capital for the payment of interest and dividends.

In the four years ending with 1829 only a little more than $4,000,000 a year was authorized by Parliament to be spent on railways. Authority was given for an average expenditure of more than $10,000,000 in each of the four years ending with 1833. In 1836 schemes involving an outlay of $225,000,000 were laid before Parliament, and it was suggested that they all be postponed for a year so that an appeal might be made from the country drunk to the country sober. Three different companies promoted competing lines to Brighton, and, although it was obvious that only one of the three bills could be passed, the shares of all the companies were quoted at a premium on the stock exchange. Parliament authorized an expenditure of nearly $55,000,000 a year in each of the four years ending with 1837, and nearly $105,000,000 in each of the four years ending with 1845. From 1830 to 1836 about 450 miles of railways were completed and 350 were in progress; the demand for engineers was difficult to supply. By 1838 the four great centers, London, Birmingham, Liverpool and Manchester, were all connected by rail. Less than 2,000 miles had been constructed in 1843, but more than 5,000 miles in 1848. The capital expended amounted to $325,000,000 in 1843 and over $1,000,000,000 in 1848. By 1861 the capital embarked in these enterprises amounted to $1,800,000,000, over $80,000,000 a year having been expended during the preceding eighteen years.

In 1845 most of the great lines had proved successful. The London & Birmingham was paying a dividend of 10 per cent.; the Grand Junction, 11 per cent.; the Stockton & Darlington, 15 per cent.; and railway shares were, on an average, at 100 per cent. premium.

The canal proprietors, panic-stricken from the inception of the new enterprises, in many cases blocked the railway projects by opposing the bills until the railways had taken over their canals. In some cases they made representation to Parliament that inasmuch as the building of a railway would destroy the usefulness of their property, the railway should be compelled to indemnify them by purchase or lease or otherwise. This feeling was generally shared by the entire public, and a decree of Parliament in many cases forced a railway to take over canal property as a step necessary to its obtaining the Parliamentary act authorizing construction. The terms on which the railways obtained the canals were not easy. The Fossdyke Navigation, in Lincolnshire, which had been leased by the Corporation of Lincoln to a Mr. Ellison at $375 a year, was leased by his executors to the Great Northern Railway for $47,875. The leases to the railways frequently provided that they were to maintain the canals in as good condition as when they received them, and to guarantee dividends. For example, the London & Northwestern made a guarantee to the Birmingham & Shropshire Union Canals that amounts to a dividend of about 4 per cent.

Claimants of all sorts against the railways asked what they chose and frequently succeeded in obtaining a good share of what they asked. The prosperity of the new lines of communication appealed to the government as a fertile source of taxation, and the perception was quickly acted on. In 1832 it imposed on railway travel a tax of ½d. a mile for four passengers and half a farthing for one. In 1842 this was modified to about 5 per cent. of the passenger fare, and this is substantially the levy now. The tax rates and government duty on English and Scotch railways in 1857 were equal to about 14 per cent. of their net receipts. In 1842 the traffic receipts amounted to less than $20,000,000, and in 1861 to $140,000,000, the working expenses in each year being about half the receipts. The return per mile during the former year was only a fraction less than in the latter, because of the extension of the railways through sparsely settled territory of scant traffic.

(To be continued.)

The government of Panama has contracted with the Panama Railway Company to build a line from the city of Panama to David, the capital of the Province of Chiriqui. The distance is about 274 miles, and it is expected that the route surveyed by the Intercontinental Railway Commission in 1893 will be followed. The road will traverse a rich district and will be an important factor in the development of a large and fertile section of the republic.

FLUE FAILURES.*

BY J. W. KELLY.

Foreman Boiler Maker, Chicago & North Western, Chicago.

Flue failures start, in a great many cases, in the designing room, by crowding in too many flues, placing them too close to the heel of the flange, or with too small a bridge. Even when properly designed the layerout often uses his own judgment and places the flue wrong. After the flue sheet is laid out, the driller plays his part by drilling the holes too large. The cause, in some cases, is that the cutters are not ground right, or that there is too much lost motion in the spindle of the drill press. It is important to have the holes drilled the exact size and uniform, as it is impossible to keep flues tight in large holes. All holes should be champered on both sides. The copper ferrules should be expanded by a sectional expander, and never with a roller, as the roller reduces the gage. An Atlantic type engine came into the shop for a new firebox, and when removed, I found the flue sheet had moved upward in the center about 1⅜ in., making the crown sheet look as if it was dropping down; when a straight edge was placed on it, we found that the crown sheet had started to raise about 18 in. from the back flue sheet. I put a straight edge on the new firebox and found it straight; then I got a tram and trammed it in the center of the flange on the top and the lower point between staybolts. The flues were set by expanding with sectional expanders and rolled very light, then beaded with a standard beading tool and inspected before the flue setter left the job, to insure proper work. I then trammed the sheet and found that it had moved upwards 3/16 in. I sent the tram with the engine for future tests and had the men report the movement of the sheet every time the flues were expanded. It was as follows:

On February 4, 1910, flues expanded and trammed after work was completed; found a movement of 1/16 in., or a total movement of ¼ in. upward.

March 11, 1910, expanded light, still 1-4 in.
April 15, 1910, expanded light, still 1-4 in.
May 29, 1910, expanded light, moved 1-32 in., total 9-32 in.
July 10 1910, expanded light, moved 1-32 in. total 5-16 in.
July 20, 1910, expanded light, full set moved 3-64 in., total 23-64 in.
Aug. 18, 1910, expanded light, full set moved 1-32 in., total 25-64 in.
Sept. 20, 1910, expanded light, full set moved 3-64 in., total 7-16 in.
Oct. 8, 1910, expanded light, no movement, total 7-16 in.

My object in making this statement is to show what this movement does later. The boiler is tested and if the material is all right, no flues have to be renewed, but on the other hand, if it is poor material, and the lap welds are not properly welded, we find the flue fails at this point in the expanding. I have, however, found cases in the center of the flues where they may fail at any time afterward in service.

The engine is ready for service and shortly afterward it fails on account of the flues leaking. What is the cause? We know the flue layout is not exactly correct, but the holes are drilled uniform and of correct size, and copper and flues were properly set and tested under 25 per cent. excess working pressure. We cannot say it is bad water, even if the engine is running in a bad water district, because it has not been out of the shop long enough to gather enough scale on the flues or flue sheet to do any harm; it has been washed out properly every three or four days. This failure is surely due to abuse—feed water not properly applied, or not fired right are two of the principal causes. The flues are and must be set back properly to the sheet again, and the engine will make successful trips, if the engine crew is taken to task by the right party.

We must keep the engine clean and free from scale by removing all washout plugs, especially those in the front flue sheet, and washing between the flues, back to the back flue sheet. Be sure that the long nozzle is used in every hole, because if you let it go until the space between the flues is filled up solid you all know what happens—flue failure after flue failure and cracked bridges. These flue failures are all up to the roundhouses, but as we are going to keep the engine clean, I will try and show why it still fails on account of flues leaking.

The engine arrives at the terminal with only a fair fire, not very much steam, and a half glass of water, not leaking, and is therefore not reported. The hostler gets on the engine and finds these conditions, rushes it to the cinder pit, puts on the blower and gets the fire out quickly so as to get it into the house before the steam is gone—the water is also going fast. When he reaches the table, he starts the injector and fills the boiler until the injector breaks, and what has happened? Every flue has started to leak badly, whch means the whole set must be expanded before the engine leaves the house. But possibly it is the only engine in and the roundhouse foreman has ordered it out, because he looked at it on arrival and knew it was not leaking. There is then a failure of flues, either by holding and doing a proper job, which should be done every time, or by taking a chance and telling the boiler maker to calk her up, or dry her up and let her go. The engine goes out on the main line and ties up everything, due to another flue failure. This kind of a failure can be stopped by compelling all engineers to leave their boilers full of water, a good fire, and plenty of steam. The engine is towed to the nearest roundhouse and the boiler maker is ordered to do the necessary work. He starts by using a mandrel, and pins out the flues and calks them with a beading tool, which is altogether too large and has no bearing on the bead, but cuts and grooves the flue sheet and spoils the bead. The engine is started out and fails again on account of flues leaking. This pinning of flues and the use of improper beading tools have caused a great many failures and every foreman boiler maker should watch this matter closely and stop it.

Everybody in charge is after the engine now, and the orders are to put it in first-class condition before leaving the roundhouse. The flues are again expanded, this time properly, and well beaded, and it does good work for a few days when a new hostler forgets the water and puts it in the house with 1 in. of water in the glass.

About two hours later the fill-up man finds no water in the glass and connects the hose to a blow-off cock located near the throat sheet. As the engine is ordered out, he fills it up quickly with cold water, fires up and pulls out of house with a heavy fire. The engineer cannot see the flues, and when the boiler maker makes an inspection they appear to be tight. At the depot the fireman calls the engineer's attention to the flues leaking, and there is another flue failure. I might say here: Do not allow fill-up men to connect up to blow-off cocks, if the fill-up water is cold. Better still, have a standard fill-up valve on top of the shell or dome and do all the filling through this valve, thus preventing flue failures. This also applies where the engines are waiting for orders or have been standing on the side track for some time. The crew gets careless, allowing the fire to burn down, resulting in no steam; they receive orders to go and on goes the injector, and what happens? Flues all leaking and engine soon gives out, thus causing another flue failure.

A great many flue failures are caused by careless firemen allowing the fire to get too heavy and having two or three feet of clinkers next to the back flue sheet, which stops circulation, causing the flues to contract and leak. Another cause is where engines are tied up and stand outside in cold weather. The fires are allowed to burn down and are only kept alive at the door hole. The injector must be put on, the cold water goes down to the bottom flues, and we get the same results as stated above, flues leaking.

There are several other causes, such as running with the fire door open, leaky steam pipes, poor firing, by having no fire for 10 to 20 in. from the back flue sheet, filling up hot boilers in roundhouses with cold water; in every case the flues must be worked over, and this continuous work in every case gives more or less trouble until the sheet is removed from the firebox.

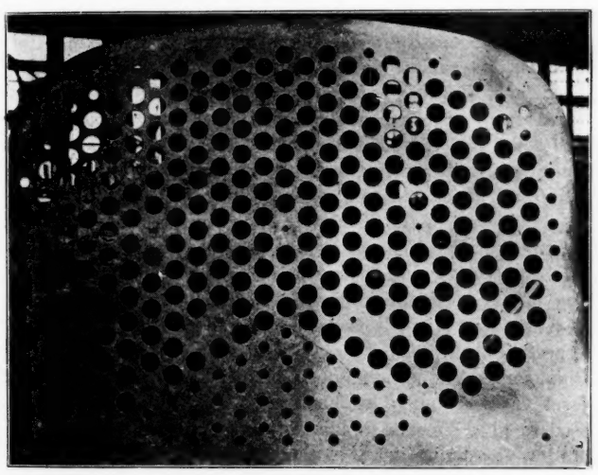
We all know what happens when beads drop off. Flues are

*Abstract of a paper presented before the Western Railway Club, November 15, 1910.

plugged, especially if the throat sheet is short and the flues are too low down. If it is possible to run an engine with the bottom flues plugged and it still does good work and is light on coal, why not leave these flues out, so they will not be there to contract and leak? What this point in view, I got permission to experiment with one engine. I plugged up about 40 flues and put a stay rod in the center of the plugs. The engine went into service and did as well or a little better as to coal, and steamed fine. The flues were applied November 6, 1907, and the engine was put in heavy freight service for test purposes. Flues gave very little trouble, and were removed when the engine received general repairs to machinery, but they were still in fair condition on April 7, 1910.

The point I want to make is this: Do not crowd in too many flues because you must have the required heating surface. Keep the top flues down from 4 in. to 4½ in. from the flange to the center of the flue hole. The illustration shows the standard layout with stay rod holes where the flues are left out. These engines when received from the locomotive works had 342 flues and 5/8 in. bridge. They have, with the present layout, 280 flues, 13/16 in. bridge, and the flues are laid out with the taper of the sides of the flue sheet, which gives a wider bridge in the bottom, better circulation and a chance to let the sediment down. I recommend this wherever it can be applied.

We are applying this scheme to all engines of this class receiving new fireboxes or new back flue sheets, and are getting



New Spacing of Flues; Chicago & North Western.

good service. You all know there are a great many engineers who never have leaky flues or any kind of a flue failure, and the flues run for several months without being expanded. This is why some boilers and flues give such good service. Flue sheets do not move upward so fast and cause trouble, while on the other hand, engines of the same class with other engineers always leak and have all kinds of failures, doing practically the same work. While the flues and flue sheet must stand for these failures, nevertheless they are men failures.

We know from tests on the New York Central that the flues moved upward. I have proven that the back flue sheet moves upward when the flues are continually expanded. Now, with the power getting larger all the time, these large boilers must have more attention; we must depart from the old rut and try and grow larger with the boiler, because we cannot expect the same results with the same methods we had when the boilers had 150 flues and carried 135 to 150 lbs. steam pressure. It is my opinion that we must go even farther than above suggested and meet this situation by reinforcing the back flue sheet in some manner to help take care of these sudden contractions of flues and the upward movement of the back flue sheet and flues. But with present conditions, we must hold engines from service when the flues become thin and have poor beads and remove them before they make several failures. Do not try to get just one more trip and fail on a very important train.

WORKMANSHIP AT TERMINALS.

The method of taking care of flues at terminals is narrowed down to the sectional expander and beading tool. If flues are leaking slightly, use a beading tool that fits the bead properly and calk well. If a set of flues are loose, and leaking badly, they should be properly expanded and calked. The roller expander should never be used, as it rapidly thins the flue and reduces its ultimate life. The mandrel or tapered pin should under no circumstances be used, as this tool shears off the bead in time and only dries up the flues temporarily and they soon become leaky and will fail. The beading tools should be watched very closely and kept up to the standard gage, as flat tools soon destroy flues.

BRICK ARCHES.

Brick arches are playing their part in helping to keep flues tight, and should, in my opinion, be placed in all large locomotive boilers, tight against the back flue sheet, with an opening in the corner to allow sparks to go down. Among the advantages of the brick arch are fuel economy and better combustion. It reduces the cutting action of sparks on the beads by keeping a large percentage in the firebox and stops the small light fuel from passing through and stopping up flues.

In conclusion, we must educate everybody who handles engines to the importance of keeping an even temperature in these large boilers, of applying feed water correctly, and of properly opening blowers, and of the evils due to cooling the engine down too quickly and washing with cold water. The boiler must be washed out properly and must not be allowed to fill up with mud, which produces cracked bridges. All flues should be bored out; brick arches should be applied in every engine before leaving the roundhouse, and, at last, but not least, we must have good flues and flue work.

THE NEW LONG AND SHORT HAUL LAW.

The railways have until February 17, 1911, to decide what they are going to do about the new long and short haul section of the Interstate Commerce act. The power given to the Interstate Commission by this section of the Mann-Elkins act is second in importance among the powers given by it only to that conferring on the commission authority to restrain advances in rates. There is a widespread impression that under the new law the commission can and probably will rigorously prohibit railways from making higher rates for shorter than for longer hauls except in the most unusual circumstances. It is desirable that this impression be corrected. The order issued by the commission on October 19, regarding the steps to be taken by the roads toward complying with the amended long and short haul section, gives no definite indication as to the specific policy that the commission intends to pursue in administering it, but it does seem to make plain that the commission will not try to enforce this section rigidly. For the commission to try to do so would be to disregard the clear intention of Congress, for a bill to prohibit railways from in any case charging more for a shorter than for a longer haul was introduced at the last session and defeated. The main difference between the section finally adopted and that in the original Interstate Commerce act is the original act made it "unlawful for any common carrier * * * to charge or receive any greater compensation in the aggregate for the transportation of passengers or of like kind of property, *under substantially similar circumstances and conditions*, for a shorter than for a longer distance over the same line"; while the amended act strikes out the words *under substantially similar circumstances and conditions*, and makes clearer the intention of Congress that before a railway may charge a higher rate for a shorter haul it must get the express consent of the commission. Until February 17 the roads may continue to make rates as they have heretofore. After that they must not charge

a higher rate for a shorter haul unless they first get the explicit authorization of the commission, or invalidate the law by litigation.

While negatively it is clear that Congress did not intend the railways to be absolutely prohibited from charging a higher rate for a shorter haul, it is not clear when Congress meant that this might be permitted. There was a strong feeling that the existing method of making rates was wrong; but as to just what ought to be done to make it right the lawmakers did not have any clear idea, so they turned the whole job of making it right over to the commission. Under the old law some guidance was given to the commission by the words "under substantially similar circumstances and conditions." They plainly implied that where circumstances and conditions were substantially dissimilar a higher rate for a shorter haul might properly be charged. The fact that these words were deliberately stricken out by the Mann-Elkins bill shows that some substantially dissimilar circumstances and conditions which the courts have held to justify non-observance of the long and short haul principle do not justify it in the opinion of Congress. But under just what circumstances the long and short haul principle may be disregarded seems to be left by the act, if the fourth section be read alone, to be determined entirely by the commission.

Most railway lawyers do not believe, however, that if the question is ever litigated the courts will hold that the commission has such unlimited discretion. They contend that the railway has a property right in the beneficial use of its property. This includes the right to make any rate which is not unfairly discriminatory or unreasonable. They argue that there are certain conditions in which the fixing of a higher rate for a shorter haul is neither unreasonable nor unfairly discriminatory. It follows that the right of a railway under such conditions to charge a higher rate for a shorter haul is a property right which cannot be taken away. If it be answered that the law does not absolutely take its right away, but gives the commission discretion to determine when it may be exercised, it is replied that this does not cure the defect in the provision. The commission is an administrative body of delegated powers. Congress cannot confer on such a body authority without laying down the rule by which it is to be guided in exercising it; and the new long and short haul section gives no such guidance.

On this theory the law cannot be upheld as constitutional unless it be read as a whole and it shall be held that in some other part of it Congress has laid down the rule which is to guide the commission. It is contended that if the rule is laid down anywhere it is in the first section, which requires rates to be reasonable, and in the third section, which prohibits them from being unfairly discriminatory. Under this interpretation a railway which desires to disregard the long and short haul principle must first apply to the commission. If the commission denies its application the road may appeal to the courts on the ground that the adjustment of rates it proposes to make would not be unreasonable nor unduly discriminatory. And if the court finds that this contention is true, it will nullify the commission's ruling just as in previous years it nullified its orders when the courts differed from it as to whether certain circumstances were dissimilar within the intendment of the original Interstate Commerce act. On this theory the new long and short haul section differs from the corresponding part of the old law a great deal, as that part of the new law giving the commission jurisdiction of rates in general differs from the one in the Hepburn act. Under the Hepburn act the commission had no control over the initiation of rates. It could act with reference to a raise in rates only after the raise had been made. Under the new law it may restrain an advance until it has determined whether it is reasonable. Similiarly, under the old law a railway might itself determine whether particular circumstances and conditions were sufficiently dissimilar to justify departure from the long and short haul principle and make rates accordingly, and the commission could not interfere with them until they were in effect. Under the new law the railways are prohibited from disregarding the long and short haul principle without first having got the consent of the commission; the railway cannot make an unreasonable or discriminatory adjustment and keep it in effect until some shipper complains and gets it changed.

Some lawyers are inclined to think that the courts may hold that Congress did give the commission complete discretion to determine whether a higher rate may or may not be made for a shorter haul, and that its action in doing so is constitutional. The decisions of the Supreme Court of the United States construing the long and short haul clause of the original Interstate Commerce act do not throw much light on the question; for practically all, if not all, turned on the meaning of the words "substantially similar circumstances and conditions," which do not now appear in the law. But in 1901 the Supreme Court rendered a decision which is regarded as having more or less of a bearing on the matter. This was in the case of the Louisville & Nashville *vs.* Kentucky (183 U. S. 502).

The constitution of Kentucky contained a provision identical with the long and short haul clause of the original Interstate Commerce act, and the Kentucky legislature passed a law to give effect to it. The state railway commission, which also was created by the state constitution, prohibited the railways from in any case disregarding the long and short haul principle without its express consent. The Louisville & Nashville disregarded the commission's order and was prosecuted. It contended that the Kentucky law was unconstitutional on much the same grounds on which it is now contended that the new federal long and short haul law is unconstitutional. The Supreme Court of the United States decided against the railway.

There are several important points, however, in which this case differed from any that could arise under the Interstate Commerce act. The Kentucky commission was created by the state constitution, while the Interstate Commerce Commission exercises only powers delegated to it by Congress. The long and short haul clause was in the Kentucky constitution, while the federal long and short haul clause is merely an enactment of Congress. The Kentucky law and the action of the commission in administering it had been upheld by the Kentucky supreme court, and it is a familiar principle that the federal courts will uphold the interpretation put by a state court on a state law or constitution if this can be done without violating some provision of the federal constitution. The Kentucky constitution and the law passed to give effect to it laid down a rule for the commission to follow, by indicating that the long and short haul principle might be departed from where conditions were substantially dissimilar, while the present federal law does not lay down any such rule. It would seem that the only question on which the Kentucky case might be a precedent for a case arising under the existing federal law would be whether a law or an order of a commission which absolutely prohibits the charging of a higher rate for a shorter haul deprives a railway of its right of property to make reasonable rates. This question was directly raised in the Kentucky case, and the federal Supreme Court said:

"Though it be conceded that ownership in a railway is property, it is property of a kind that is subject to the regulations prescribed by the state. We do not wish to be understood as intimating that if hereafter the railway commission should fix and establish rates of a confiscatory character the company would be without the protection which courts of equity have heretofore given in cases of that description. What we now say is that a state corporation voluntarily formed cannot exempt itself from the control reserved to itself by the state by its constitution, and that the plaintiff in error if not protected by a valid contract cannot successfully invoke the interposition of the federal courts in respect to the long and short haul clause in the state constitution on the ground simply that the railroad is property."

In other parts of its decision the court repeatedly indicated that it based its decision "upon the proposition that the company takes and holds its franchise and property subject to the conditions and limitations imposed by the state in its constitution." Now, of course, the same thing could not be said of any railway which contested the constitutionality of the federal long and short haul law, because no road has taken and holds its franchise and property subject to any such federal constitutional conditions and limitations.

In view of all these circumstances it seems improbable that the Kentucky case can be considered a precedent indicating what the Supreme Court will decide regarding the constitutionality of the new federal long and short haul clause. Of course, if it is a precedent, it indicates that the court will uphold the law. But A. P. Thom, general counsel of the Southern Railway, undoubtedly expressed the consensus of legal opinion when, at the hearing before the Interstate Commerce Commission on October 8, he contended that either the amended fourth section must be construed merely to give the commisison the initiative to prevent the making of rates that are unreasonable or unfairly discriminatory, or it must be held unconstitutional.

Probably, sooner or later the question of the constitutionality of the new long and short haul law will be fought out in the courts. Meantime, the disposition of most railway legal and traffic officers is to try to work out and agree with the commission on some adjustment of rates which will make possible the avoidance of litigation. Heretofore there have been some violations of the long and short haul principle which cannot be defended on sound economic or ethical grounds, and there have been others which are defensible on these grounds but which seem so indefensible to the general public that in the long run the roads might gain by eliminating them from their tariffs. If, therefore, the commission does not lay down rules which seem to the railway officers altogether too drastic, there is ground to hope that some adjustment which will be reasonably satisfactory will be reached without litigation.

The cases where higher rates have been made for shorter than for longer hauls present the most infinite variety. Numerous examples of discriminations which seem against public policy may be cited. Suppose the case of a number of railways competing between large and important termini from which they get a big share of their total traffic. This competition pulls and keeps down the rates between the termini, while, there being no similarly intense competition to local points, the rates to the latter are kept up, violations of the long and short haul principle resulting. In such a case there is dissimilarity in the circumstances and conditions under which the traffic to the large terminal points and the traffic to the local points is handled, consisting in the large amount of traffic given by the terminal points and the fiercer competition between the carriers for it. But it is questionable if these are conditions of dissimilarity which justify disregard of the long and short haul principle. Do neither law nor fairness give to one community the right to have lower rates than another because it is able to give a larger amount of traffic, any more than they give to a large shipper the right to enjoy lower rates than a small shipper? The intense competition between the carriers is a condition created by themselves, and they cannot claim that conditions created by themselves, and which they can remedy, justify them in so discriminating as to give one community an advantage over another.

The Supreme Court, in its opinion in the case of East Tennessee, Virginia & Georgia et al. *vs.* Interstate Commerce Commission (U. S. 181), suggested a case where disregard of the long and short haul principle would be plainly unfair.

"Take the case," said the court, "where the carrier cannot meet the competitive rates to a given point without transporting the merchandise at less than the cost of transportation, and, therefore, without bringing about a deficiency which would have to be met by increased charges on other business. Clearly in such a case the engaging in such competitive traffic would both bring about an unjust discrimination and a disregard of the public interest, since a tendency toward unreasonable rates on other business would arise from the carriage of traffic at less than the cost of transportation to the particular places."

As there are some examples of disregard of the long and short haul principle that are plainly indefensible, so there are many which are conclusively defensible. The best, of course, are those where railways meet active and controlling water competition at more distant points which they do not meet at intermediate points. The commission, even in its early attempts to administer the original Interstate Commerce act, never held that where water competition was active and controlling a lower rate might not be charged for a longer haul, although it did differ from the roads about whether they could thus fix rates without its previous consent. The best examples of lower rates for longer hauls made to meet the water competition are found in the southeast and on the Pacific coast. There has been nothing said or done to indicate that the commission will refuse to let the roads make lower rates from New York to San Francisco, for instance, or from New York to New Orleans, than to intermediate points. The law as it now stands not only gives the commission authority to say whether a lower rate may be made for a shorter haul, but also althorizes it "from time to time to prescribe *the extent to which such designated common carrier may be relieved from the operation of this section.*" The theory on which the railways have acted in the past has been that where water competition was controlling they could make any difference between the water rates and the rates for the longer and the shorter hauls that they liked so long as the rate for the longer haul was not positively unremunerative and the rate for the shorter haul was not excessive. It is evident, however, that the commission now has—whether it had before or not—the authority to limit the amount of the discrimination which may be made between the intermediate and the more distant points.

Of course, the defense advanced for the distinction made between the more distant and the intermediate points in cases such as this is that the railways do not make the rates to the more distant points. The water lines make them. They must meet the rates fixed by the water lines or go out of business at the more distant points. But because competition forces them to accept a lower rate to the more distant point than they otherwise would is no reason why they should be prevented from charging a reasonable rate, even though a higher one, to the intermediate point. They could not afford to make rates as low in proportion on all of their lines as they make to meet water competition. If they were required to do this they would have in many cases to refrain from meeting water competition. The result would be that they would lose any profit that they make by hauling traffic to the more distant point, and, in order to earn a fair return, they might have to raise their rates to the intermediate points; in any event, the enforcement of a rigid long and short haul rule would be of no benefit to many intermediate points.

One fact very commonly overlooked is that the railways of the United States do not encounter water competition from river and coastwise water lines alone. Ocean steamships carry a large amount of grain from the Pacific coast around Cape Horn to Europe. There are times on the return trip when they can hardly get enough traffic for ballast. In consequence, they make very low rates from Europe to the Pacific coast on many bulky commodities. One of these is cement, which they carry in large quantities from Belgium. To meet this competition the railways make a very substantially lower rate on cement shipped from Hannibal, Mo., and Buffington, Ill., to the Pacific coast than to intermediate points. They could not make their present coast rates their maxima. If they were required to do so they would simply quit hauling cement to the coast and the Belgium producer would get all the business.

A good example of lower rates for longer hauls made to meet both rail and water competition that really covers the entire earth is afforded by the rates on grain and its products. Flour shipped from the United States to Liverpool meets there the competition of wheat and flour hauled there by rail and water from Canada, Russia and Argentine. It must be laid down there at a freight rate which will enable it to be sold at a profit. To enable the American producer to meet the competition in the markets of the world the rate on flour for export from Minneapolis to New York is made 21½ cents, while the rate to interior points is higher—to Paterson, N. J., for instance, it is 25 cents.

Still another example of the same kind is afforded by the rates made by the Chicago, Milwaukee & St. Paul on cotton piece goods moving to the Orient. The rates from different places vary, but, generally speaking, it may be said that the rate from points in the Southeast to Spokane is $2.50; to the Pacific coast, $1.32,

and that the proportion of the through rate received by the St. Paul and its connections on cotton piece goods moving from the Southeast to the Orient is 94 cents. The reason why the lower proportional rate is made on goods moving to the Orient is that these goods may move either westward through the United States and across the Pacific ocean, or eastward over the Atlantic ocean and through the Suez canal to the Orient. The other transcontinental railways formerly made lower proportional rates on goods moving to the Orient than to the coast, but when they were required to publish the inland proportions of these rates they raised them to the same basis as the Pacific coast rates, rather than disclose to the public what revenue they had been getting from oriental business. The St. Paul has been able to get a good deal of this business since it became a transcontinental line.

On economic grounds the justification for making lower rates for longer hauls when, as in these cases, it is absolutely necessary in order to meet competition not only with coastwise steamships but with ocean steamships moving over all the waters of the earth, seems complete. The German state railways and other railways of Europe also make lower rates on export than on domestic business. Nevertheless, the course of the railways of the United States in thus making rates has been the object of bitter criticism. It is an interesting question to what extent some of the roads will continue to make rates in this way, even if they get the consent of the commission—and if not its consent, that of the courts—to do so. The western transcontinental lines are confronted by the fact that in a few years the Panama canal will be done and that then the coastwise steamships can make much lower rates between the Atlantic and Pacific coasts than now. Furthermore, it is doubtful if the bitter sentiment the existing rate adjustment has excited against the roads can ever be changed except by a change in the method of making rates. The Interstate Commerce Commission in the various Pacific coast rate cases has held that the rates of the railways to intermediate points are unreasonable per se. Furthermore, as the Panama canal soon will be finished, it seems to some railway officers desirable that any discriminating done in future should be in favor of the interior country, since the railways will always get all of the traffic there, while they are apt to have to fight harder and make lower rates for the coast traffic. In these circumstances, it seems worthy of consideration whether the roads would not gain in the long run by raising their rates to the coast to a basis where they would be reasonable regardless of water competition. With rates made on this basis they would be able to get some traffic from the Eastern seaboard to the coast, for some traffic will seek the railway rather than the waterway even though the railway rate is much higher. On the other hand, there is no doubt that if the railways raised their coast rates they would lose a very large part of their traffic from the Eastern seaboard to the coast. But some railway officers are a little inclined to think that what they would lose in this way would be less than they will lose in the long run by continuing to make extremely low rates to the coast, which may be invidiously compared with their relatively high rates to the interior.

As is well known, the rates of the roads to the coast have been blanketed from the Eastern seaboard back to the Missouri river. In other words, lower rates have been made from Chicago, for example, to the coast than to intermediate points as well as from New York. This has been done to enable manufacturers and jobbers in the Middle West to compete with Eastern manufacturers and jobbers for business on the Pacific coast. In other words, it has been due to commercial competition. The Interstate Commerce Commission has pretty clearly indicated to the railway officers that the commission would not approve of the continuance of this method of rate-making, and has intimated that Chicago should be used as a dividing line and that, while from points east of it rates may continue to be made lower to the coast than to intermediate points, from Chicago and points west of it the railways must desist from making lower rates to the coast than to the interior. To draw the dividing line at Chicago would be rather arbitrary. Starch now moves in considerable quantities from Keokuk, Iowa, which is west of Chicago, to the Atlantic and thence by boat to the Pacific coast. South Bend, Ind., is only a short distance east of Chicago, and yet when the transcontinental lines a short time ago raised the rate on wagons from South Bend to the Pacific coast from $1.25 to $1.35 they found this change was sufficient to cause the traffic to begin to move to the Atlantic and thence by boat to the Pacific coast. In consequence, they restored the old rate. But, no doubt, the commission feels that if a line is to be drawn at all it must be drawn arbitrarily, and that Chicago is as good a place to draw it as anywhere. If this is done the rates from Chicago to the coast will have to be made the maxima to intermediate points. This would make it necessary for the roads to reduce all of their rates to intermediate points to the basis of their preesnt coast rates, for the commission has held that any higher rates to Spokane from the East than those now made to the coast are unreasonable. On the other hand, it would not prevent the roads from raising their rates to the coast. If they reduced their rates to the interior and at the same time raised their rates to the coast they would suffer for some time a very heavy reduction in revenue from both their interior and their coast traffic, which would have to be made good—if it ever were made good—by an increase in the traffic to the interior.

The difficulties which the Southeastern lines would meet in complying with a rigid long and short haul rule are perhaps even greater than those which would be met by the transcontinental lines. Not only are the Southeastern states completely bounded on the east and south by the Atlantic ocean and the gulf of Mexico, but there are innumerable navigable rivers running from the ocean and the gulf into the interior. The roads have been able heretofore to hold their own against the waterways because they have been permitted to make lower rates where they have met water competition than where they have not. In its earlier decisions—for example, in the case of Board of Trade of Troy, Ala., *vs.* Alabama Midland—the commission held that water competition which was merely potential did not justify disregard of the long and short haul principle. If the commission should so rule now and the courts should uphold it, the Southeastern lines would have to choose whether they would reduce all their intermediate rates or raise the rates to the more distant points. If they adopted the former alternative, their revenues from their local business would be heavily reduced. If they adopted the latter alternative they would at once attract water competition. The water competition might then become active and controlling, in which event, under the old ruling of the commission, the roads would be justified in reducing their longer haul rates once more. If by this reduction they succeeded in destroying the water competition once more they would be placed in a peculiar predicament, for the Mann-Elkins act put into the Interstate Commerce act an entirely new provision regarding water competition. This appears in section four, and is as follows:

"Whenever a carrier by railroad shall in competition with a water route or routes reduce the rates on the carriage of any species of freight to or from competitive points, it shall not be permitted to increase such rates unless after hearing by the Interstate Commerce Commission it shall be found that such proposed increase rests upon changed conditions other than the elimination of water competition."

Now, the water competition having ceased to be active, it would seem that under the rule laid down by the commission in its earlier decisions the roads would have to quit making lower rates for the longer hauls. But they could not raise rates which had been made to meet water competition without proving that there had been some change in the conditions besides the elimination of water competition. It would seem that in that event if the commission stuck to its old rule, and the law were not modified, the southeastern railways would have no alternative but to reduce all of their intermediate rates. It will be recalled that the Supreme Court in its decisions construing the original Interstate Commerce act overruled the

commission, and held that where water competition actually had existed and would revive if railway rates were raised there existed a dissimilarity of circumstances and conditions which authorized the railway to make a lower rate for the longer haul. In view of these decisions of the courts and the changed personnel and greater experience of the commission, it seems not improbable that the commission may hold in construing the Mann-Elkins act that where potential water competition exists it justifies a lower rate for a longer haul, although it is easily conceivable that it may rule now as it did originally. In that event there would most certainly be litigation with the railways in the Southeast, as their traffic is still so light that they could not stand very heavy reductions in their earnings.

In addition to effective and controlling water competition, it has been generally recognized that where one of two railways running between competitive points has a substantially longer line than the other, it is justified in meeting the rates made by the shorter line between the competitive points, while charging higher rates to intermediate points. The defense of the practice is the same in this case as where a railway meets controlling water competition at one point which it does not meet at another point. The only place, it is believed, where the long and short haul rule has been consistently and rigidly enforced is in Iowa. The popular notion is that where this is done all of the intermediate rates will be reduced so that they will be no higher than the rate via the long line for the longest haul. This has not been the result in Iowa. In that state the longer line between any two points, in preference to decreasing its earnings by reducing its intermediate rates, has usually refrained from meeting the rate of the shorter line to the competitive point. The effect has been to keep the longer line from getting any profit that it might have derived from the competitive business and to deprive the people at the points where there are more than one road from getting any of the benefits of competition. Who benefits and who is hurt by this policy depends mainly on how much difference there is between the lengths of the competing roads. In many cases a road which is longer than a competing line between two points is shorter than the same line between two other points, and what it loses by not competing between the two former places it gains by its competitor refraining from competing between the two latter. But it seldom happens that the advantages and disadvantages of a road balance each other. There are some roads which are the short lines between most competing points and other roads which are the long lines between most competing points. Obviously, in these circumstances, rigid enforcement of the long and short haul rule will benefit the former and the shippers living on them and injure the latter and the shippers living on them, for the long line, being unable in many cases to make rates to the competitive points, must get its revenue mainly from its local traffic, which involves the necessity of making high rates on this traffic. Whether a long line will, where the long and short haul rule is rigidly enforced, meet the rates of the short line at competitive points and reduce its local rates, or will refrain from meeting competition and keep up its local rates, depends largely on the relative amounts of the local and the competitive traffic. If the terminal points are large cities, such as Kansas City and Chicago, or St. Paul and Chicago, it probably will prefer to stay in the competitive business and reduce its local rates. On the other hand, where, as in Iowa, there is no very great difference between the sizes of the various cities, the opposite policy is apt to be adopted.

While railways under the conditions existing in Iowa may submit without a determined contest in the courts to the enforcement of a rigid long and short haul rule, because the amount that they lose by it is relatively small, it seems inconceivable that they would do so where the amount involved was very large. For example, the Chicago & North Western and the Harriman lines between Chicago and Spokane are much longer than the Hill lines. For the former either to make their rates to Spokane their maxima to intermediate points or to quit meeting the competitive rates to Spokane would involve loss of a large amount of revenue; and it is not conceivable that in such circumstances railways would submit to enforcement of the long and short haul rule without a stubborn legal contest. It is worth noting in this connection, also, that while, where the amount that a railway will lose by applying the long and short haul rule is small, the courts might not hold that enforcement of it was unconstitutional, enforcement of it, which would involve the loss of a large amount of revenue, might be held confiscatory of the property of the longer line.

While in most cases the lower rate is made for the longer haul because of controlling water or rail competition at the more distant point, this often is done for other reasons. For example, the rate on furniture from Chicago to the Pacific coast is lower than to intermediate points. This is not due to water competition, because furniture naturally does not move by water. It is due to the fact that there are factories on the Pacific coast which make furniture from lumber grown in that section, and it is considered necessary for the railways to make a low rate to the coast on furniture from the East if the Eastern manufacturer is to be enabled to compete with the coast manufacturer. As the coast manufacturer, in order to sell furniture in the interior, must pay a freight rate to get it there, the Eastern manufacturer can pay a higher rate to intermediate points and still sell it there at a profit. There is a number of other cases where lower rates are made to the coast than to interior points for similar reasons.

The justification for making a lower rate for a longer haul when rail or water competition is met at the more distant point which is not met at the intermediate points seems clear. But purely commercial competition is a different thing from transportation competition. The railways do not find a lower rate to the Pacific coast on furniture. They make the lower rate themselves in the first instance, and it is open to very serious question whether, as a matter of public policy, they are justified in doing so. Such rate-making, while it may be defensible on purely economic grounds, especially where a road has to adopt it to earn a fair return, excites so much public antagonism that it is doubtful if it does not cause more losses than profits. It is even questionable if it is a good thing from the economic standpoint for the railways. In the long run the best policy for a railway to follow is to protect and foster its own producers; and certainly a more effective way for the transcontinental roads to develop manufacturing on the coast would be to so adjust their rates as to favor the coast manufacturers instead of those in the East.

The main prerequisite to a satisfactory settlement of the long and short haul question—as well as of all other important railway questions—is that the public shall get the railway's point of view, and the railway the public's point of view. Persons without any special knowledge of railway affairs who discuss violations of the long and short haul principle usually talk as though they think the discriminations railway managers make between communities are willful and malicious. A little thinking would convince them this is not true. The railway manager is equally interested in the development of all the communities along his lines, and he naturally would rather get the same or a higher rate for a longer as for a shorter haul, simply because the longer haul costs more, and the practice of charging lower rates for longer hauls excites public discontent. It ought to be clear, therefore, that when a lower rate is made for a longer haul there must be conditions beyond the control of the traffic manager which prompt, or even compel, him to do so, and the public ought to study and understand these conditions before in any given case it condemns this method of rate-making.

On the other hand, it is daily becoming clearer that railways cannot be managed solely according to the principles which their managers believe to be right. Railway managers ought to do all that they can to educate public sentiment, so that the public

will be able to form a fair and intelligent opinion of the effect on the public interest of the policies followed by the roads. Where laws are passed which wantonly attack the constitutional rights of the railways they are, no doubt, justified in litigating them. But if satisfactory relations are ever established between the railways and the public, the railway managements must recognize the fact that some things which it would be right and desirable for them to do if the public could be made to see that they are right and desirable may become wrong from the railway standpoint when the public persistently and uncompromisingly condemns them. There are many discriminations in rates which railway men believe operate to the public good but which the public—often ignorantly—condemns. If the public cannot be convinced that such discriminations are right, it may be better to desist from making some of them, provided the railway can do so without reducing its profits below a fair return. The result of antagonizing public sentiment in regard to some matters of this kind is to provoke attacks on the railways which may in the long run cause them and the public more loss than the railways and the public would suffer from the railways complying with some of the public's unreasonable demands.

NATIONAL ASSOCIATION OF RAILROAD COMMISSIONERS.

The twenty-second annual convention of this association was held in Washington, November 15, 16 and 17. The addresses of Messrs. Knapp and Decker at the opening were noticed last week, page 975.

The convention declined to approve the report of its committee on railroad taxes. The report was opposed on the ground that market value suggested by the report as an element in railway valuation was impracticable as a basis of taxation of railways generally, and no action was taken on it. Reports on statistics, on simplification of tariffs, on shippers' claims, on rate-making, on powers, duties and work of state commissions, and on grade crossings and trespassing were discussed and with minor changes were adopted.

Officers for the coming year were elected as follows: President, R. Hudson Burr, of Florida; vice-presidents, Charles F. Staples, of Minnesota, and O. P. Gothlin of Ohio; secretary, William H. Connolly, chief clerk of the Interstate Commerce Commission; assistant-secretary, William Kilpatrick of Illinois.

The association decided to hold its next annual convention in Washington on October 10, 1911.

The report discussed at length the various methods of ascertaining the value of railway property, reciting that the most important facts on which to base a determination were actual cost of construction, cost of reproduction new, depreciated value, amount and market value of stock and bond issues with a full financial history of the road, density of population and traffic, nature and permanence of population and traffic, facilities for doing business, physical characteristics, and amount of earnings and operating expenses. An extended debate showed that the discussion of the report would never end, and it was finally ordered to be printed without having the approval of the convention.

The committee on railroad statistics, Henry C. Adams, chairman, reported that it had spent considerable time investigating a proposal submitted to it for a change of the time for ending the fiscal year from June 30 to December 31. Replies received by the committee from state railway commissioners and from carriers indicated that there was no strong desire for a change of the date for closing the fiscal year. In view of that condition the committee decided that it would be unwise to recommend such a change.

The committee on legislation recommended that the states not having railway commissions should pass laws establishing them and suggested that the laws of Wisconsin or of New York might be taken as a model.

The convention adopted resolutions creating a committee on telephone and telegraph rates and service, and authorizing its committee on statistics to take up the subject of statistical reports of telephone and telegraph companies.

The committee on car service and demurrage was instructed to consider what, if any, measures should be taken to guard against car famines.

As before noted, the report of the committee on taxes and plans for ascertaining the value of railway property was not satisfactory, and it proved to be a subject for contention. This report was presented by John C. Lawrence, chairman of the committee which had framed it. The report began by stating that in 29 states railways were taxed on a property valuation only. In five states the tax was levied on property value together with specific taxes, in four states on gross receipts, in three states on property value and gross receipts, in two states on capital stock and gross receipts.

The association voted that through a committee it would ask Congress to withdraw from the federal courts the right to review cases arising from decisions of state railway commissions, so that such cases should first go through the state courts. A resolution was passed asking the supreme court of the United States to take such action as might be found possible to expedite cases involving the validity of orders of either the Interstate Commerce Commission or any state commission. A resolution was passed recommending that all states should by law put track scales under the authority of the state railway commission. This action was taken on the report that in Minnesota track scales had been found to give incorrect weights.

The committee on safety appliances presented a report, but it was not considered until the last hour of the third day. The committee had labored under the disadvantage of the sickness of the chairman, Mr. Moseley, so that the report was not prepared until a day or two before the meeting. The committee briefly reviewed the results of the work of the Block Signal and Train Control Board, quoting some of the decisions of that board in its last annual report. The disastrous collisions which have occurred on interurban railways during the past few months came up for discussion and the practice of interurban lines generally was criticised in severe language. Their methods were spoken of as unsafe; their personnel is very much less efficient than that of steam railways. Their rules are crude and ill constructed. The committee called upon the convention to take action looking to the establishment of uniform rules on such railways and to recommend the compulsory use of the block system. This improvement is more necessary on electric lines than on steam, because the discipline is more lax and the companies generally do not require a sufficient period of apprenticeship for motormen. A standard code of train rules should be enforced on all railways. In the state of Washington three companies are using a single railway 150 miles long, and one of the three does not use the standard code. The whistle signal, calling attention to flags carried, is the same that the other companies use for the highway crossing signal. Congress should take action looking to the enforcement of the A. R. A. standard code or something equally good. The American Railway Association has no power to enforce its rules. The report closed with a recommendation that Congress should be asked to promptly make compulsory the use of automatic train stops, granting a period of years for preparatory work. The report is signed by William Kilpatrick of Illinois, W. G. Smith of South Dakota, John A. Webb of Mississippi, and S. L. Rogers of North Carolina.

In the discussion of the report Mr. Sullivan of Ohio, a member of the committee, said that he had refrained from signing it because of the criticism of the interurban lines. In Ohio the commissioners have been doing some missionary work, and the interurbans are now "getting along fairly well." Besides this, Mr. Sullivan looked upon the automatic stop as purely experimental, besides being costly. Mr. Lawrence of Washington referred to the inconsistent whistle signal mentioned in the report. His inspector had called attention to this situation, but the

state commisison could do nothing, because of the conflict with interstate supervision which would have been entailed. He referred to the action of the Washington Water Power Company which had lately installed automatic block signals with an automatic stop on its electric line in the state of Washington.

Mr. Kilpatrick spoke of the conditions in Illinois. After a recent collision in that state it developed that the block signal man who was at fault, and who was a temporary man, had gone on duty with two quarts of whisky in his grip-sack. Moreover, he was working under a false name, having been in states prison for murder. After such happenings as this, Mr. Kilpatrick thought that the proper thing to do was to urge the general adoption of automatic block signals.

Mr. McClure of Indiana moved to amend the recommendation in the report so that it should call for the enactment of a law requiring interurban electric roads to be "adequately blocked" and that a longer period of service on train should be required as a requisite to employment thereon in responsible positions; and also he would have power given to the Interstate Commerce Commission to require the use of a uniform code of signals throughout the United States. With this amendment the report was adopted. Mr. McClure said that in one of the investigations in his state it appeared that motormen were put in service after only about three weeks' training.

Mr. Dickinson of Michigan spoke in favor of compulsory use of the block system on both steam and electric lines. He said that a collision in his state last August [at Durand], where ten persons were killed, was caused by the absence of the block system. The Michigan commissioners found that the railways of that state pretty generally believe in the block system, but this particular road either did not believe or else did not act on its belief, so ten persons were killed. Mr. Dickinson had known of motormen being put in charge of cars on electric lines within fifteen days after they came from occupation in non-railway employment.

RAILWAY BUSINESS ASSOCIATION.

The annual dinner of the Railway Business Association was held at the Waldorf-Astoria Hotel, New York City, on the evening of November 22. President George A. Post presided at the dinner, and addresses were made by Martin A. Knapp, chairman of the Interstate Commerce Commission; Daniel Willard, president of the Baltimore & Ohio and of the American Railway Association; and John Claflin, president of the H. B. Claflin Company. Some original poems were read and a facetious talk made by Tom Daly, a Philadelphia newspaper man.

About 800 members and guests attended the dinner. The following sat at the speakers' table: Albert Allen, John N. Carlisle, John Claflin, E. A. S. Clarke, William E. Corey, Thomas A. Daly, Martin S. Decker, H. Fitzgerald, W. P. Hamilton, A. Barton Hepburn, James J. Hooker, Otto H. Kahn, John Kirby, Jr., Martin A. Knapp, J. V. Knight, Milo R. Maltbie, D. S. Marfield, Wm. McCarroll, P. H. Morrissey, Frank A. Munsey, John B. Olmsted, George W. Perkins, Ralph Pulitzer, Charles M. Schwab, George W. Simmons, John A. Sleicher, John C. Spooner, Frank W. Stevens, Isidor Straus, John Wanamaker, Daniel Willard.

The following composed the reception committee: E. A. Simmons, *Railway Age Gazette,* Chairman; W. B. Albright, Sherwin-Williams Company; J. C. Currie, Nathan Manufacturing Company; H. W. Davis, Hart Steel Company; R. L. Gordon, Standard Steel Car Company; O. C. Gayley, Pressed Steel Car Company; J. M High, Pantasote Company; J. M. Hopkins, Camel Company; C. H. Howard, Commonwealth Steel Company; H. G. Hammett; Scott R. Hayes, Railway Steel-Spring Company; W. O. Jacquette, Manning, Maxwell & Moore, Inc.; H. G. Kittredge, Kay & Ess Company; J. A. Lamon, McCord & Company; G. E. Molleson, G. E. Molleson Company; George Moses, James B. Sipe & Company; Mark A. Ross, Pyle-National Electric Headlight Company; C. P. Storrs, Storrs Mica Company; F. K. Shults, Charles Shults, Worth Brothers Company; S. L. Smith, National Malleable Castings Company; C. A. Schieren, Jr., C. A. Shieren Company; Alexander Turner, Bronze Metal Company; E. H. Walker, Standard Coupler Company.

Following are abstracts of the addresses of Messrs. Knapp, Willard and Claflin:

ABSTRACT OF MR. KNAPP'S ADDRESS.

The question of railway rates, that is to say, of railway revenues, involves vastly more than the direct interest of shippers or shareholders. In a very real sense, in a sense which is fortunately coming to be better understood, it is a great question of national policy second to none in its economic importance. That the compulsion of competition among the carriers is an unwise and mistaken policy I am persuaded. It is out of the question to have the presence of competition and the absence of discrimination. Just so long as competition between carriers is unrestrained, just so long will it result in policies which are dangerous, for to compete is to discriminate. It is a fallacy to condemn discrimination and at the same time to insist upon the very policy which promotes it. For this reason I advocate the legal sanction of coöperative action between railways regarding rates.

Speaking only for myself, and without reference to the pending controversy over rate advances or any other concrete instance, I suggest three aspects of this question which are of immediate and intense public concern. If our country is to grow and prosper as it ought, if its untold resources are to be developed and its swelling numbers find profitable employment, we need and must have railway earnings sufficient for three things:

First, a return on railway investments of such amount and so well assured as to attract and secure the necessary capital—an enormous sum in the aggregate—to improve existing roads and to construct without delay thousands of miles of new lines in fruitful districts now destitute of any means of transportation. It is a matter of common knowledge that the output of traffic for the fiscal year 1907 exceeded our entire carrying capacity on land and water. With the rapid increase of population and of productive efficiency, that is, with a greater army of workers and better industrial organization, the volume of that year ought to be and will be nearly doubled in another decade if only we can provide for its prompt and proper distribution. And when we think of the rich regions yet unopened because unserved, when we recall, for example, that there is today in the old state of Maine a section larger than the whole of Massachusetts in which there is not a rod of railway, must we not be impressed with a realization of pressing need and of boundless opportunity. Since it is our national policy—and long will be, I trust—to rely upon private capital and private enterprise to provide these great highways of commerce, to improve and multiply them in pace with our requirements, must we not in the larger public interest, whatever may be thought by this or that shipper, make the business of furnishing railway transportation, which shall be up to the best standard of efficiency, convenience and safety, so desirable to the investor that the necessary funds for betterments and extensions will be forthcoming, and so attractive as a vocation that the highest ability will be employed in its management? Otherwise, if unhappily this is not done, must not our country come measurably to a standstill and face a future of comparative stagnation?

Second, the payment of liberal wages to an adequate number of competent men. This not only to insure increasing skill and reliability in a service which is all the while becoming more exacting, and on which the safety and comfort of the public constantly depend, but also because of the very great influence of railway wages upon the compensation of labor in every sphere and grade of private employment. To my mind the fundamental social problem is to provide, by the wise development of our institutions and without radical action or injustice, for a more equable diffusion of the bountiful wealth which the earth produces. Now, as a large and increasing majority of the able

bodied live, and must live, by working for others in some capacity, a high and advancing standard of payment for service of every sort tends strongly to promote, and is the best practical means to bring about, the degree of equality in social welfare which makes for the satisfaction and happiness of all our people.

Third, the betterment of existing lines so as to greatly augment their serviceableness to the public, as can in varying degree be done everywhere, without unnecessary and undesirable increase in capitalization. Every dollar borrowed to improve a road now in operation involves a permanent addition to the interest charge which the public is required to pay; the improvement from current earnings puts no lien upon the property but rather augments its value and usefulness, and by adding to the security of the capital already invested tends to a lower rate of interest upon that capital. Broadly speaking, this means a national policy, so to speak, in respect of railway rates and revenues in harmony with our national policy in other matters of public concern, and in accordance with that enlarging spirit of altruism which manifests itself in public as well as in private life, and which impels the present assumption of burdens that might be escaped or deferred in order that another generation may have an easier task and a larger opportunity. Is it not in this particular field a wise and patriotic policy?

ABSTRACT OF MR. WILLARD'S ADDRESS.

The industries represented by your association constitute a powerful economic force, and your organization has for the first time brought that force to bear on public opinion. It was fortunate for the railways of this country, and I believe a fortunate thing for its commercial industries as well, when the Railway Business Association was formed. You have already performed a most valuable service in the way of bringing about a better understanding between the railway managers and the railway users, and your efforts in that direction deserve hearty recognition. I do not hesitate to say that the railways fully appreciate and gladly acknowledge what you have actually accomplished and will welcome a continuation of the same policy.

I am extremely anxious to see a better understanding reached between the railways and those who use them; but, I have never seen any substantial or lasting progress made towards such understanding by parties holding views greatly at variance, until they were both ready and willing to accept the truth, if it could be found, and then act accordingly.

The American railway, except in the extreme East, has almost universally gone ahead of the population or even the settler. The building of a railway under such circumstances was a hazardous undertaking. Men could not be found willing to assume the altogether too apparent risk of loss, unless in some manner there was thought to be something which promised large reward. In many instances large reward was realized. Had it not been so there would have been no railways. Similar risks were assumed in other enterprises in a new country and similar expectations of large reward were indulged in and just as frequently realized.

In the course of time complaints began to be made that the railways were showing special favors to some individuals and communities and withholding such favors from others. It was claimed that rebates were being granted the better to cover up the transaction. It was claimed also that the roads charged less in some instances for a long haul than for a shorter haul when the circumstances were substantially the same. It was claimed that the railroads exercised a controlling influence over some of the legislative bodies, such influence resting largely upon the issuance of free transportation and in some cases the actual payment of money. It was claimed that the railways were over capitalized and that in some instances large fortunes were made by improper, not to say illegal, practices in that connection. Doubtless there was sufficient cause for complaint. To hold otherwise would be to hold that men engaged in railway affairs were not subject to the same human limitations and weaknesses that are known to be the common heritage of mankind. It was claimed that the pooling practice, at that time much in evidence, was inimical to the interest of the shipper and its abolishment was demanded, though so far as I am able to learn, no general complaint was ever made that rates, as a whole, were excessively high. Other minor complaints against the carriers were also registered.

The feeling aroused by these various practices finally found expression in laws, notably the Interstate Commerce act, with successive acts amendatory thereof.

Granting, for the sake of argument, that the builders, owners and managers of the railways were in common with the rest of mankind subject to all weaknesses and limitations that the human race is heir to, let us see how much foundation in fact there is, or ought to be, at the present time for such distrust as still seems to exist.

The rebate and unjust discrimination have disappeared, or, if not altogether, then the relief is to be found in the enforcement of the existing law. I submit no additional law is necessary in that direction. The long and short haul question seems to be fully covered by the recent amendment. Recognizing, however, the far reaching effect the so-called long haul practice has had upon the general commercial and industrial development of this country, Congress has seen fit—wisely, I think—to give the commission much latitude concerning it. A strict and literal enforcement of the law would mean commercial disaster to many communities.

The influence of the railways upon legislation has been, I believe, largely if not entirely eliminated. This has come about partly by the people requiring of their representatives a closer accountability and partly by the fact that the railways, recognizing the higher ethical standard concerning such matters today, have endeavored to adjust their practices in harmony therewith.

The claim that the American railways are over capitalized is still urged in some quarters. In that connection the following comparisons of capitalizations per mile are interesting:

England	$275,040
Belgium	169,806
France	139,390
Austria	112,879
Germany	109,788
United States	59,000

In my opinion to duplicate the American railway system today would cost a sum very much in excess of the existing capitalization, and while I do not believe a physical valuation of the railways would serve any useful purpose, I am convinced that the railways have nothing to fear in that direction.

James J. Hill, whose knowledge of this subject rests upon the most careful thought and inquiry, has well said: "The American railway pays the highest wages in the world out of the lowest rates in the world, after having set down to capital account the lowest capitalization per mile of all the great countries of the world."

While the railways as they stand today, have cost nearly $14,000,000,000, as shown by their outstanding capitalization, it is certain that the development of the country will make necessary further large expenditures for additions to and betterments of the existing lines. It has been well stated that one billion dollars a year, for a number of years at least, will be absolutely necessary for these purposes. How will the money be obtained? By offering something in the way of a security sufficiently attractive to make the money forthcoming; for, as one of the honorable members of the Interstate Commerce Commission has well said:

"We can provide by legislation the sort of cars which a railway shall use and the rates which it shall impose; we can not by legislation force one single dollar of private capital into railway investment against its will."

The cost of railway operation has been increasing for some years, and there is no apparent reason for thinking that this upward tendency will cease. It has been due in part to higher prices for material, higher wages paid for labor, to the higher standard of service demanded by the public, and to various leg-

islative requirements, such as the hours of labor law, the so-called "full crew" bill, etc. Please understand that I am not criticising the laws referred to, nor am I complaining because of the higher standards of today; but, whether good or bad, necessary or unnecessary, they serve to increase the cost of operation and to that extent reduce net earnings. During the last ten years particularly, the American railways have spent enormous sums for improvements, such as reducing grades, eliminating curvature for double track, and enlarging and improving terminals, etc., and the economies resulting from such expenditures have gone far toward offsetting the constantly increasing cost of operation. The possibilities of future economies resulting from further similar expenditures, have been very largely exhausted, so that if costs continue to go up, there would seem to be only one way now to meet the situation, and that by an increase of rates.

Under the recent amendment of the interstate commerce law it is now impossible for the carriers to advance any rate unless such increase is approved by the commission. This operates, as I view it, to place the credit of the railways in the hands of the commission, for the credit of the railways is dependent upon the net earnings, and the net earnings will depend very largely upon the rate received.

Much has been said about what is a fair and reasonable return on money invested in railway securities. If the railways were finished and no new capital needed, it might then be interesting to discuss what rate of interest or dividend should be paid in the future on money borrowed in the past. That, however, is not the situation; the railroads are not finished and they will need and must have large sums in the future and it will not be obtained by telling the man whose money is desired that he will be paid a *fair* rate. The man who has money to lend, taking him as a class, will decide, not what is a fair rate, but what is a *satisfactory rate to him,* and in reaching that conclusion he will be influenced by many elements, not necessary now to refer to, but which taken as a whole constitute credit.

The question of what is a fair and reasonable freight rate is also a difficult one to determine. Certain it is, as I view it, that the sum of all such rates must at least be sufficient, when combined with efficient management, to furnish such net earnings as will enable the individual road to obtain the necessary new capital when needed on a favorable basis, otherwise, because of impaired credit, money could not be raised at all, or if raised, then under such conditions as would probably add to the embarrassment.

What of the future? Speaking for myself only, I believe that the roads (referring to them again in a personal way), should recognize in the future more generally than they have done in the past, that while they represent private investment and on that account are under certain precise as well as implied obligations to their security holders, they are also charged with a public service to perform, and there are also certain clear and implied obligations in that direction, among which are these:

To treat all alike, giving as full consideration as possible to all reasonable requirements. In short, while giving full and proper consideration to the right of the security holders, to give fair consideration also to the rights and feelings of the users—they are partners in the enterprise.

I think the roads should keep out of politics. This makes it necessary to take the public into their confidence so far as possible, so that the public, being fully and correctly informed, may act intelligently and fairly towards railways.

I think the roads, through their proper officers, should co-operate as far as possible with the Interstate Commerce Commission in trying to bring about a better understanding on the part of all.

The commission, newly charged with greatly increased responsibility incidental to increased power, will, I have no doubt, gladly welcome a spirit of coöperation on the part of the carriers. I have confidence in the intelligence and integrity of the commission. It is the duty of the railways to see that the commission is fully informed concerning the roads' necessities. It is of great importance also, as I view it, that the atmosphere of public discussion should be so free from heat and animosity, that the commission may be assisted and not impeded by public opinion so formed, in reaching just and wise conclusions. To this end, I believe most, if not all, of the railways, by their present policy in dealing with the public, are earnestly endeavoring to avoid needless antagonism or misunderstanding.

I would not like to have it thought, because of anything I have said, that I am opposed to the policy of government supervision of the railways; on the contrary, I am convinced that, under all the circumstances, it is for the best interest of all—railways as well as the public—that there should be effective government regulation; but, it is also equally important that such supervision or regulation be fair as well as effective, and that it be not so extended as to destroy or discourage individual initiative and enterprise. I will even go so far as to say that I am also convinced that the only alternative to such control by the government, as I have indicated, is government ownership.

I assume we are all equally interested in the prosperity of our country as a whole. We can not have such prosperity as we all desire while the second largest industry in the land, measured by capital investment, remains inert. I positively know that there is today in the minds of railway managers a feeling of hesitancy, of uncertainty, as regards the future. Possibly that feeling is not justified by the facts, by the conditions. Possibly the managers are mistaken. None the less, the feeling is there and it is dominating the situation, and the all important question is—how can it be corrected? How can the feeling of distrust, which now rightly or wrongly so powerfully influences the policy of the railways, be allayed? I should say by removing the cause, and, unless I have altogether failed to make clear what is in my mind, I think the cause, as I view it, should be apparent; but, to be specific, let the people who use the roads and want the roads, now indicate that, having secured the passage of such laws as they considered necessary in order to correct the conditions complained of in the past, they are now willing (as I think they should be) to open a new account with the future. Let them consider each new proposal for legislation with entire freedom from any spirit of retaliation. I do not say that it is necessary to undo anything already done (although experience may show such action to be wise in some instances), but I do say that the railways should be given a respite from further legislation—State or Federal—for a time at least, and until they can work out some of the many problems now confronting them. If such a course should find favor in the minds of the people and reflected in their attitude towards the carriers, I do not hesitate to say that the patient now indisposed would immediately show signs of convalescence.

The remedy suggested is not a serious one. Is not the experiment worth trying?

ABSTRACT OF MR. CLAFLIN'S ADDRESS.

How to meet the increased cost of living is a problem of the time. We may partially explain the advanced prices of what we eat by the reduced proportion of food producers to food consumers, and we may to an extent explain the increased cost of other things which we use by the high wages and the decreased efficiency of labor, but these explanations only show us that we may not soon expect any considerable reduction in the cost of living; that as investors and as business men we must face increased expenses, and it behooves us to determine what we can do, if anything, to increase the income of the community in general and of ourselves in particular.

The railways up to a certain point have indicated the way in which increased expenditures can be met. They have been able to increase their business largely, and a similar increase

of business is the solution of his particular difficulties that every merchant would welcome. The railways now have reached a point where it seems difficult for them to continue to increase their gross revenue materially without very great expenditures for betterments and for extensions. Under ordinary conditions the money to pay for such extensions and betterments could readily be had by the sale of bonds bearing a moderate rate of interest. At the present time, however, investors are asking larger returns on their capital than in the near past, and foreign investors, especially those who seek only the choicest of American securities, are inclined to be indifferent to the offerings of American railways, because they are doubtful in view of the recent advance in wages by the railways, whether or not the railways now have a safe margin of profit which will enable them to pay interest on all their fixed obligations and to continue reasonable disbursements to their shareholders. It seems to me the solution of this doubt is of the utmost importance to the general prosperity of this country, and its solution may be facilitated or delayed by the attitude of the merchants of the United States in regard to the advances in freight rates which the railways have proposed.

As a wholesale merchant in New York the question to me is partly academic because as a wholesaler I pay but a small portion of the freight which is charged on merchandise shipped from New York, but as an investor in retail stores throughout the country, the question lies within the scope of my personal investigation and may affect my income largely. I ask then, will it be advantageous for the average merchant outside of New York to pay some increase in freight rates to help the general situation? I think it will. Let us take as a unit a retail business of medium size amounting in sales to perhaps a million dollars per annum. If this business is located pretty far West, say beyond the Mississippi river, it may now pay $25,000 per annum for freight and express from the East. If freight rates should be raised 12 per cent. on the average it would pay $3,000 additional per annum to the railways. What would such a business be likely to gain? Let any merchant look back carefully over his records and note the fat years and the lean years and then mark the years of general railway extension and improvement on the one hand, and the years of railway retrenchment on the other, and I am sure he will find that his prosperity on the average has increased with the progress of the railways and has waned with their lack of progress.

These facts may not necessarily demonstrate a relation of cause and effect, but they certainly point to such a relation and no one can doubt that to a considerable extent such a relation exists. If the railways should now be permitted to make some such moderate advance as I have indicated and our typical merchant should pay $3,000 additional in freight and express charges, my own investigation leads me to believe that the general activity which renewed railway buying would induce would increase the merchant's business at least 5 per cent. and perhaps as much as 10 per cent. or 15 per cent. If such should be the case, at a minimum increase of 5 per cent. he would get additional sales amounting to $50,000 at slight additional expense except for freight, and it is entirely safe to say that his net gain on these sales before deducting the increased payment to the railways would be at least $6,000, or twice as much as he would pay by reason of increased rates for transportation.

If a typical business should be taken further east, say near the Ohio river, the haul being shorter the increase in the cost of freight would of course be less, while the increase of business would probably be equally great and the net gain to the merchant materially greater.

This solution of the problem for the merchant as well as for the railways seems to me the logical way out. Mercantile expenses cannot be reduced materially without reducing business proportionately, but under the impetus of a general growth of the country, mercantile business may increase in the future as it has increased in the past with sufficient rapidity to keep expenses within reasonable ratio to the amount of sales.

How can the general growth and general prosperity be best promoted? I think the railway will answer this question satisfactory if by friendly coöperation we give them the power to go ahead.

The annual business meeting of the association was held at the Waldorf on the morning of November 22. The executive committee rendered its annual report, from which the following is extracted:

"The Railway Business Association has succeeded in disseminating very generally an appreciation that the frequent and serious periods of depression to which the railway equipment and supply industries are subject widely affect also every other line of business and that these periods of distress in our industries are largely due to uncertainty as to the legislative outcome of controversies between the railways and the public.

"Such a controversy is at this moment pending. The Interstate Commerce Commission is now holding hearings on proposed advances in freight rates. The railways will not know until the decision shall have been rendered what view the commission is to take as to the resources proper for railway operation, and have been constrained to postpone new projects and cut all outlays to the minimum.

"For the railway supply industries this may mean serious distress. While our establishments are now busy, the fact stares us in the face that few of us have booked any considerable orders in several months and this dearth of orders if continued a few weeks more would see factories shutting down and men thrown out of work. We have still fresh in our memories the disaster of 1908, when at one time 600,000 men usually employed making things for railways were walking the streets. A group of industries employing 1,500,000 operatives, with a capital invested of more than a billion dollars and paying freight bills of $250,000,000 annually, cannot face a collapse of business without grave apprehension. Unless there is a change in a short time this immense aggregation, sustaining many great industrial communities, will be where it was two years ago, with all the consequent ramification of privation and suffering.

"We earnestly hope that the commission in giving its decision will indicate with all possible clearness a purpose of considering the needs of the railways in the broadest spirit. Such a decision would, we believe, enable our railways to finance the enormous improvements which must be made if the traffic of the country is to be carried efficiently and safely.

"The merchants want, of course, the best rate they can get for the transportation they use, but recently many of them seem to be thinking more about the quality of service and more about the prosperity of the railways and allied industries and less about the rate. We believe this is the broad, American view, and it should be the aim of our association to win converts to that attitude.

"It should be advertised to the world that there is in the United States an organized coöperation to the end that the railways may avoid giving offense and that the public may refrain from hasty measures. Let it be known that the American railways are safe investments because the railway men, the business men and the regulatory agencies of the state and nation have determined to make them safe.

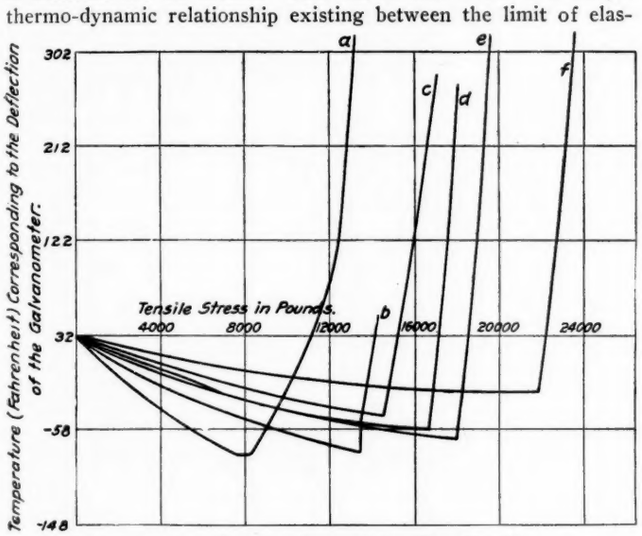
"The function of the Railway Business Association is to create an amicable atmosphere in which the railways and their patrons may make mutual concessions and avoid litigation. We believe that nothing will tend more to make business conditions more stable than for railway questions to be discussed amicably and dispassionately."

The following officers were reëlected: President, George A. Post; vice-presidents, H. H. Westinghouse, O. H. Cutler, W. H. Marshall, E. S. S. Keith, A. H. Mulliken, O. P. Letchworth, A. M. Kittredge; treasurer, Charles A. Moore.

THE LIMIT OF ELASTICITY.

Engineers are showing a strong tendency towards the adoption of the limit of elasticity as the basis for the calculation of the strength of the parts of a mechanism or structure, instead of the ultimate strength that has been the prevailing practice. The objection to adopting this has been the difficulty of determining the limit with any kind of accuracy, with the result that the ultimate strength and the guesswork of a high factor of safety has been used. The drop of the beam is rather crude, and the use of an extensometer slow, for determination of the limit of elasticity. An article in a recent issue of the *Revue Industrielle* calls attention to the well-known fact that when a test piece of metal is subjected to a prolonged tensile stress, that is less than its limit of elasticity, the temperature of the metal falls in accordance with a fixed law. When the stress is relieved the temperature of the piece soon returns to normal. If, on the other hand, the stress is carried to a point beyond the limit of elasticity of the metal, there is a sudden change of temperature, and instead of a cooling, there is a very perceptible heating.

These phenomena have been studied by such eminent physicists as Lord Kelvin and Joule, who have shown that this change of temperature takes place at the instant the metal has been stretched to its limit of elasticity. Dulong and Petit have also found that the product of the atomic weight by the specific heat is constant for all metals. This shows that there is a simple thermo-dynamic relationship existing between the limit of elasticity, the molecular constitution and the calorific properties of a metal. Prof. Martens, of the Prussian Academy of Sciences, has recently made an interesting application of this principle for the accurate determination of the limit of elasticity of metals, a determination which is far too delicate to be made in the usual manner on certain metals, such as cast iron.



Temperature Curves Caused by Tensile Stress.

The great difficulty lies in the determination of the exact point in the curve of elongation where permanent set takes place. Up to the present, investigations to ascertain this limit of elasticity by means of temperature measurements were based on the calorimetric methods. Prof. Martens' method makes it possible by a simple thermometric reading to take instant cognizance of this change of temperature.

The apparatus used consists of a series of thermo-electric couples, placed inside of a hard rubber box and set in a narrow longitudinal slot, very close to the piece to be tested, but not in actual contact with it. The current produced by the rise in temperature of the piece affects a very sensitive galvanometer which gives an exceedingly accurate thermometric reading. The illustration is a reproduction of a series of curves showing the changes of temperature which are produced by a constantly increasing tensile stress. The turning point indicative of the limit of elasticity is clearly shown. At this point the internal friction resulting from the slipping of the molecules over each other is made apparent by the rise of temperature, thus showing that the zone of permanent deformation has been reached. The test piece from which the curves shown were obtained was a bar of bronze. The curve "a" was made with the metal in its normal condition annealed; the curves "b," "c," "d," "e" and "f" show the increasing limits of elasticity resulting from successive increases in the tensile stress.

The same metal when tested in the ordinary machines does not seem to show any definite limit of elasticity, while with this thermo-electric method the galvanometer always shows distinctly a point where the change takes place. With cast iron this point of permanent stretch does not appear until the instant of fracture.

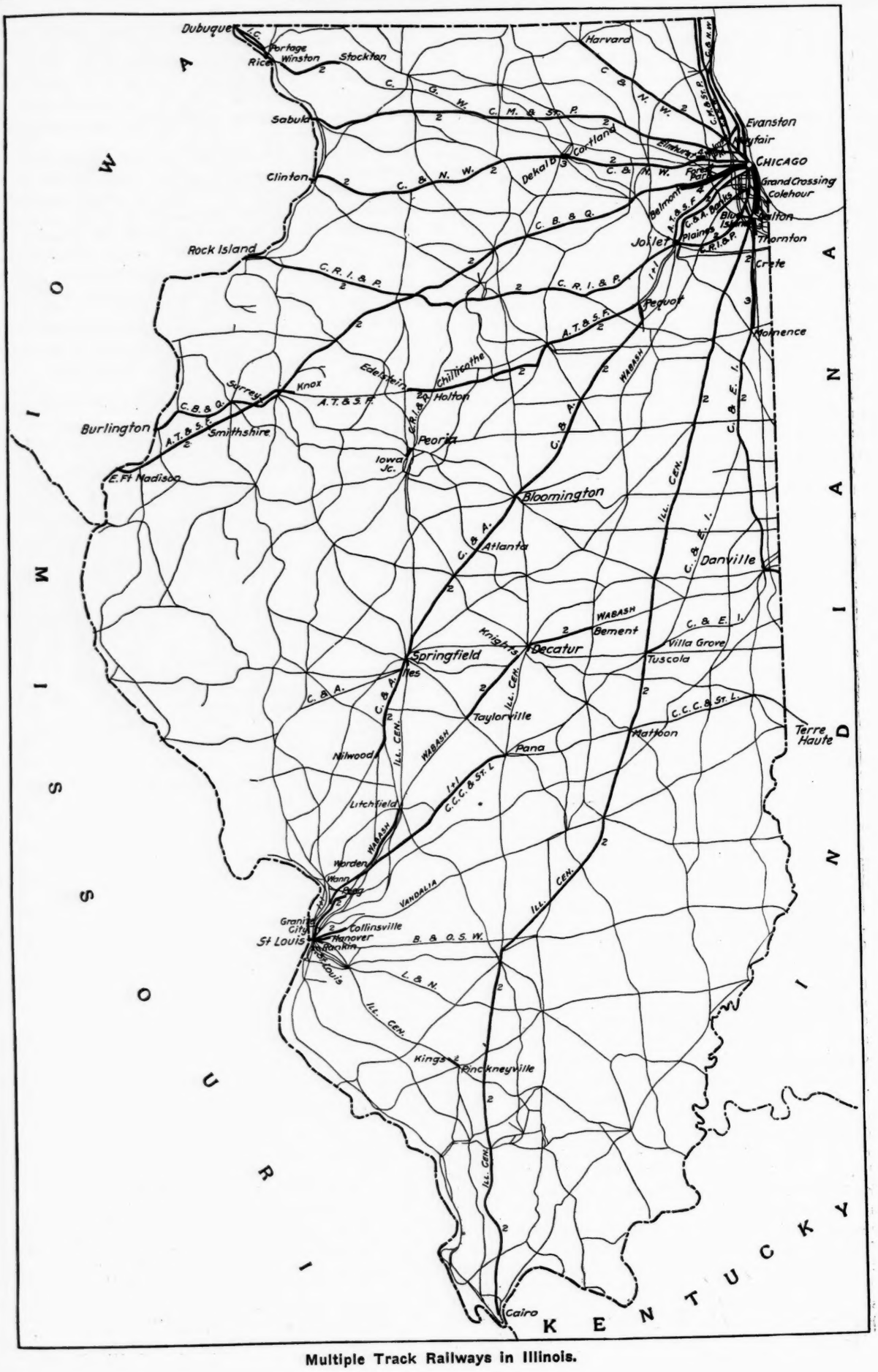
This same method makes it possible also to determine accurately the distribution of stresses throughout the section of a bar, and especially the location of the neutral axis in transverse tests. To do this, several thermo-electric couples are arranged at different heights along the transverse section of the test piece, when it is possible, by observing the temperatures of the different points, to ascertain the location of the neutral axis.

MULTIPLE TRACK RAILWAYS IN ILLINOIS.

The railway map of Illinois, given herewith, is printed for the purpose of showing all sections of railway in the state on which there are two or more main tracks. Three-track and four-track lines are distinguished from two-track by the thickness of the lines on the diagram. The termini of the different sections are shown in the table below:

ILLINOIS.

	No. tracks.	Approx. miles.
Atchison, Topeka & Santa Fe.		
Chicago to Plaines	2	40
Plaines to Pequot (with C. & A.)	2	20
Pequot to Holton	2	65
Chilicothe to Edelstein	2	8
Knox to E. Fort Madison	2	60
Baltimore & Ohio.		
Chicago to Indiana line	2	20
Baltimore & Ohio Southwestern.		
St. Louis, Mo., to Hanover	2	7
Chicago & Alton.		
Chicago to Plaines	2	36
Plaines to Pequot (with Santa Fe)	2	20
Pequot to Nilwood	2	156
Wann to E. St. Louis (with C., C., C. & St. L.)	2	18
Chicago, Burlington & Quincy.		
Chicago to Belmont	4	20
Belmont to Burlington, Ia.	2	186
Chicago & Eastern Illinois.		
Chicago to Dalton	2	16
Dalton to Thornton	3	5
Thornton to Crete	2	9
Crete to Momence	3	20
Momence to Gessie, Ind.	2	81
Villa Grove to Tuscola	2	8
Pana to St. Louis (with C., C., C. & St. L.)	2	85
Chicago & Western Indiana.		
Chicago State line	2	18
Cleveland, Cincinnati, Chicago & St. Louis.		
Pana to St. Louis (with C. & E. I.)	2	85
Grand Trunk.		
Chicago to Griffith, Ind.	2	36
Illinois Central.		
Chicago to Blue Island Jct.	4	15
Blue Island Jct. to Cairo	2	348
67th St. to South Chicago	2	6
At Springfield	2	1
At Decatur	2	2
E. St. Louis to St. L., B. & S. R. R. Jct.	2	..
Kings to Pinckneyville	2	4
Portage to E. Dubuque	2	12
Lake Shore & Mich. Southern.		
Indiana Harbor to East Side	4	6
East Side to Chicago	2	13
S. Chicago to Root St.	2	7
Root St. to 22d St.	3	3
22d St. to Chicago	2	2
Louisville & Nashville.		
E. St. Louis to Rankin	2	3
Michigan Central.		
Michigan City to Kensington	2	42
New York, Chicago & St. Louis.		
Hessville, Ind., to Grand Crossing	2	14
Pennsylvania Lines.		
Whiting, Ind., to Colehour	3	4
Colehour to Constance	2	..
Constance to Park Manor	3	..
Park Manor to S. Branch River	4	..
S. Branch River to Chicago	2	..



Multiple Track Railways in Illinois.

Chicago Great Western.

	No. tracks.	Approx. miles.
Chicago to Forest Home	2	9
Stockton to Winston	2	23
Rice to Fair Grounds, Ia.	2	19

Chicago, Milwaukee & St. Paul.

Chicago to Evanston	2	11
Chicago to Milwaukee, Wis.	2	85
Chicago to Sabula, Iowa	2	141

Chicago & North Western.

Chicago to Harvard	2	63
Chicago to Milwaukee, Wis.	2	85
Mayfair to Bay View, Wis.	2	76
Mayfair to Evanston	2	6
Chicago to Melrose Park	2	11
Melrose Park to Elmhurst	4	4
Elmhurst to Cortland	2	39
Cortland to De Kalb	3	3
De Kalb to Clinton, Iowa	2	80

Chicago, Rock Island & Pacific.

Chicago to Rock Island	2	181
Gresham to Blue Island	2	12
Peoria to Iowa Jct.	2	3

Vandalia.

Collinsville to E. St. Louis	2	11

Wabash.

Chicago to Indiana Line	2	20
C. & W. I. Jct. to Banks	2	18
Bement to Decatur	2	20
Knights to Taylorville	2	26
Litchfield to Worden	2	20
Poag to Granite City	2	10

TRAIN ACCIDENTS IN OCTOBER.[1]

Following is a list of the most notable train accidents that occurred on the railways of the United States in the month of October, 1910. This record is intended to include usually only those accidents which result in fatal injury to a passenger or an employee or which are of special interest to operating officers. It is based on accounts published in local daily newspapers, except in the case of accidents of such magnitude that it seems proper to write to the railway manager for details or for confirmation:

Collisions.

Date.	Road.	Place.	Kind of Accident.	Train.	Kil'd.	Inj'd.
2.	Del., Lack. & W.	Scranton.	xc.	P. & F.	0	18
3.	Lake Erie & W.	Laporte.	rc.	F. & P.	0	20
*6.	N. Y., N. H. & H.	Bolton, Conn.	rc.	F. & P.	3	4
6.	N. Y., N. H. & H.	Sharon.	xc.	F. & F.	0	2
*9.	Phil. & R.	White Hill.	rc.	F. & F.	1	0
12.	L. S. & Mich. So.	Youngstown.	bc.	F. & F.	1	3
13.	Balt. & O. S. W.	Cincinnati.	bc.	P. & P.	0	11
14.	Grand Rapids & I.	Ridgeville.	bc.	F. & F.	5	18
16.	Char. & W. Car.	McCormick	bc.	P. & P.	5	17
19.	Chi. & Alton	Nilwood.	bc.	P. & F.	0	8
†30.	Chi., M. & St. P.	M'tevideo, Minn.	rc.	P. & F.	4	4

Derailments.

Date.	Road.	Place.	Cause of Derailment.	Kind of Train	Kill'd.	Inj'd.
4.	N. Y., N. H. & H.	Naugatuck Jct.	derail.	F.	1	1
8.	Chic. & Alton	Jerseyville.	d. track.	P.	0	18
13.	St. Louis & S. F.	Compton, Ok.	unx.	P.	0	42
13.	Del. & Hudson	Richmondville.	unx.	F.	2	0
15.	Atchison, T. & S. F.	Greenfield, N. M.	acc. obst.	P.	1	1
15.	Balt. & O.	Winchester.	.....	P.	0	8
15.	Mo., Kan. & Tex.	Gainesville.	unx.	P.	1	4
17.	Southern Pac.	Chocar.	unx.	P.	2	2
20.	Hocking V.	Harpster.	unx.	P.	2	29
24.	Atlantic C. L.	Jacksonville.	open draw	P.	1	0
31.	San Ant. & A. P.	Halletsville.	unx.	P.	1	3

In the collision at Bolton, Conn., on the 6th, two light engines, coupled together, ran into the rear of a passenger train standing at the station. The men killed were the engineman of the passenger train and a bystander who was trying to assist the engineman in repairing a defective coupling. The two engines completely wrecked the rear car of the passenger train, but it was an empty car. The collision was due to a false clear signal given by a block signal operator at a tower about one-third of a mile west of the point of collision. This operator had been in this place only three days, having recently come from the West. He is twenty-three years old.

The collision at White Hill, Pa., on the 9th, was caused by an engineman falling asleep in his cab. This seems to have been admitted by the engineman himself in testifying at the inquest on the death of a brakeman named Charles, who was in the standing caboose that was run into. According to the newspapers the engineman said that he had had little chance for sleep during the few days preceding. The collision occurred Sunday morning, about six o'clock. The coroner's jury exonerated the engineman from blame for killing the brakeman, holding that as the flagman had got out of the standing caboose and had run back 150 ft. to flag the on-coming train, and as the flagman had warned Charles, he (Charles) must have had ample time to escape.

The butting colliison near Ridgeville, Ind., on the 14th, was between a freight train and a work train and the victims were laborers riding on the work train. Five of these men were killed and 18 injured. The collision was due to the failure of the freight to protect itself. There was a dense fog and the freight entered the working limits of the work train without flagging. The men killed were sitting on the end of a platform-car with their legs hanging between the car and the tender of the locomotive.

The butting collision of passenger trains near McCormick, S. C., on the 16th, was between northbound and southbound passenger trains, both running at full speed. Two enginemen, two firemen, a mail clerk and a porter were killed and 15 passengers and 3 trainmen were injured. The collision was due to the failure of the operator at McCormick to deliver an order to the southbound train. He neglected to display a stop signal, but the conductor of the train was expecting orders and went to the office and asked for them. He did this not only once, when he went to register his train, but he asked a second time, as he was leaving the office. An officer of the road writes that the conduct of this operator is unaccountable. He is a man 30 years old, with nine years' experience as a telegrapher. In sending the order to him the despatcher directed him to display red and he replied that he had done so, but entirely forgot to carry out what was apparently his intention.

In the collision at Montevideo, Minn., on the 30th, four drovers were killed. They were in the caboose of a freight train which was run into at the rear by a passenger train, the fourth section of eastbound train No. 6. The caboose was wrecked and took fire and the bodies of the men killed were burned to a crisp. Two cars of cattle were also burned up, as well as a number of box cars standing on a side track.

The train derailed near Winchester, Va., on the 15th was southbound passenger train No. 1. The first vehicle to jump the track was the tender. Two passenger cars were overturned and fell down a bank, and twenty-seven passengers were slightly injured. The engineman had applied the brakes a few seconds before the accident, in order to reduce speed over a bridge; and the derailment occurred just as he again put on steam to resume speed. The engineman thought the brakes were sticking and used full steam pressure in order to move the train, and this, it is said, was the cause of the derailment. The tender was the first vehicle to leave the track in three other derailments in this list: Compton, Okla.; Harpster, Ohio, and Halletsville, Tex.

Of the ten accidents to electric cars reported in the newspapers as occurring in the United States in October, four were attended with fatal results. One of these, the butting collision at Staunton, Ill., October 4, killing 37 persons and injuring 20, was reported in the *Railway Age Gazette* of October 7, page 662. In a collision on an interurban line near Pittsburgh, on the 20th, during a fog, two persons were killed and 10 injured; and in a derailment at Boston on the 15th, due apparently to a defective switch, three persons were killed and six were injured.

[1] Abbreviations and marks used in Accident List:
rc, Rear collision——bc Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc. obst, Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or pass., Passenger train—F. or Ft., Freight train (including empty engines, work trains, etc.)——asterisk, Wreck wholly or partly destroyed by fire——dagger, One or more passengers killed.

General News Section.

The Erie road has been making experimental runs near New York City with a passenger car propelled by power from an Edison storage battery; and the Pennsylvania with a McKeen gasolene motor car.

The constitutional convention in New Mexico, which has nearly finished its work, has adopted a clause providing for a corporation commission of three members. The commission is to be elective and there is a provision for the immediate review by the State Supreme Court of all of the commission's orders, whether anybody asks for review or not.

On Saturday last President McCrea and other officers of the Pennsylvania Railroad entertained a party of about 200 officers and agents of the Pennsylvania Lines West of Pittsburg, by showing them around the new passenger station in New York City, to which the through trains of the road will begin running next Sunday. During the past few months the Pennsylvania has run a number of New York excursions of this kind for its station agents and others; a fine example of one of the best methods of increasing the men's efficiency as servants of the public; while at the same time their spirit is improved by promoting their acquaintance with each other and with the officers.

The supreme court of Oklahoma on November 16 reversed the order of the Oklahoma corporation commission requiring Interstate carriers to establish depots at the Oklahoma state line, the court holding that the state commission is without authority to arbitrarily require a railway to build stations and switching facilities at places not required by public convenience or necessity. The appeal from this order was made by the Atchison, Topeka & Santa Fe. Another order of the commission requiring the St. Louis & San Francisco to build switches to the property of elevator owners at its own expense has been reversed, and many other orders of the commission requiring railways to build switches under these conditions have been set aside by this decision.

The extent to which physical valuation of railways as a basis for rate-making is in the political atmosphere is reflected in the present popularity of the subject for college debates. For example, last week teams representing the Iowa State College, at Ames, Iowa, and the Iowa State Teachers' College, at Cedar Falls, Iowa, discussed this question in two debates, one at Ames and the other at Cedar Falls. The subject of the debates was "Resolved, that railway freight rates should be based on the physical value of railway property used in transportation service," and in both debates the team taking the negative of the question won. At Ames, two of the judges voted in the negative and one in the affirmative, one of the judges being Professor Jesse Macey, a well-known authority on political science. At Cedar Falls all three of the judges voted in the negative.

The American Association of Railway Surgeons, at its meeting held in Chicago recently, went through the usual list of unhealthy conditions in cars and railway stations which the surgeons are going to improve; and in addition they introduced one new idea: They are going to do what they can to stop the use of abandoned freight cars as lodging houses for track workmen. For this move, looking to the improvement of the hygiene of track laborers' lodgings, the laborers should be duly thankful, and we congratulate them. At the same time we congratulate the traveling public, (in anticipation) on the abolition of a frequent eyesore. What is more depressing than a box-car minus trucks, minus paint and *plus* a few ragged holes for windows (like igloo windows)? Moreover, such cars usually bear the initials of the name of the unashamed owner, still sufficiently visible to be read from every parlor car that passes by.

On November 20 the Rock Island Lines put on a new 72-hour train, "The Californian," which will operate daily between Chicago and Los Angeles via Kansas City and El Paso. The train, which leaves Chicago at 8:35 a. m., arrives at Kansas City the same evening and reaches Los Angeles the morning of the third day, is equipped with electric lighted drawing-room and tourist sleeping cars, free reclining chair cars and coaches, and provides dining car service. A compartment sleeper has been placed in service on the "Golden State Limited," between Chicago and Santa Barbara, Cal., and entirely new Pullman equipment has been provided for this train. A new train has been put on for points between Chicago and Davenport, Cedar Rapids and the Twin Cities, leaving Chicago at 3:10 p. m. The new train makes all stops which have previously been made by the "Chicago-Twin Cities Express," and the latter train will be operated on a fast schedule, making stops at Joliet, Bureau, Moline and Rock Island only. Dining car service has also been provided on the Chicago Twin-Cities Express. The Illinois division train, which formerly left Chicago at 1:25 p. m., has been discontinued.

Practical demonstrations are being given at the exhibit of the Rock Island Lines at the Land Show in Chicago of the modern agricultural methods which are being advocated by the agricultural department of those lines. Experts from many of the western agricultural colleges are co-operating in the demonstrations so that they are of interest and practical value to the farmer and consumer. The Land Show opened in the Coliseum in Chicago on November 19 and will continue until December 4. Twelve free lectures will be given in the lecture room as follows: "Practical Equipment for Growing Poultry," and "Doubling the Egg Yield," by Prof. W. E. Vaplon, of the Colorado Agricultural College; "Methods for Increasing the Yield of Wheat," by Prof. L. A. Fitz, of the Kansas Agricultural College; "Practical Systems of Farm Management," by Prof. Thomas Cooper, of the Minnesota Agricultural College; "Increasing the Amount of Meat Per Acre," by Prof. C. M. Evans, of the Texas Agricultural College; "How to Grow Rice," by Prof. C. V. Ruzck, of the Arkansas Agricultural College; "How Our Cotton is Grown," by Prof. T. M. Jeffords, of the Oklahoma Agricultural College; "Growing Alfalfa in Different Climates and on Different Soils" and "Methods of Dry Land Farming," by Prof. H. M. Cottrell, agricultural commissioner of the Rock Island Lines; "Increasing Farm Profits," by Prof. Andrew Boss, of the Minnesota Agricultural College; "Doubling the Yield of Corn," and "Demonstrations of Selecting, Caring for and Testing Seed Corn," by Prof. M. L. Mosher, of the Iowa State College.

The New Pennsylvania Time-Table.

The Pennsylvania, announcing the completion of the time-tables for the train service to and from its new station in New York City, which is to begin next Sunday, gives the number of trains as follows: Westbound, week days, 61 trains; eastbound 55; Sundays, westbound 46; eastbound 43. The old station at Jersey City will have on week days 118 trains westward and 131 eastward. All of the local and suburban trains will continue running to and from Jersey City, as well the trains of the Lehigh Valley and the New York, Susquehanna & Western. The length of the new line from the New York station to Manhattan Transfer, the junction of the old line, is 8.7 miles and the running time of trains will be 15 minutes. With the new time-table there will be a train from New York to Broad Street Station, Philadelphia, every hour from 7 a. m. to 9 p. m., and all will be on the even hour except two (4:04 p. m. and 8:04 p. m.) and nearly all of these trains will run through in two hours. In addition to these there are others at other hours, making in all 25 express trains each week day from Seventh avenue, New York, to Broad street, Philadelphia; and there is a corresponding service from Broad Street to New York. All of the trains to and from the new station will be through express trains, except that for certain Long Branch expresses running from Jersey City connecting trains will be run from Seventh avenue. There will be expresses to Washington at 8:08, 10:08, 11:08, 1:08 and 2:08 and at less regular intervals thereafter; besides the through trains for the South. With the

abandonment of the ferry to and from Twenty-third street, New York, passengers in upper New York desiring to use Pennsylvania suburban or local trains will have to go downtown to Cortlandt or Church or Desbrosses street; unless, indeed, they take express trains at Thirty-third street and change cars at Manhattan Transfer. Whether the road will allow this does not appear. All of the express trains will stop at Manhattan Transfer eastbound to let off passengers for Jersey City and the lower New York termini, and westbound to take on.

Water Level in the Great Salt Lake.

The present behavior and past history of Great Salt Lake are now the object of a special investigation by the United States Geological Survey. The United States Weather Bureau precipitation records, beginning in 1863, present a comparatively accurate record of the levels of Great Salt Lake dating back to the year 1850. In 1850 the Lake stood at 3 ft. In 1868 the water rose to 14 ft., dropped to 7.5 ft. in 1873, and rose again to 14 ft. in 1877. The lake then gradually lowered until the water stood at —2.4 ft. in 1902 and —2.2 ft. in 1905. Since 1905 the water has gradually risen, reaching the 6-ft. mark in May, 1910. The lake is now falling.

Many millions of dollars have been spent in the construction of railways and resorts over or near the shores of the Great Salt Lake. If any data can be secured which will enable one to make a reliable prediction as to the behavior of the lake ten years in advance the information would be of inestimable value. It will be necessary to determine whether or not there are regular periods of wet and dry years; also to determine the time intervening between two wet and two dry periods. To determine this point one should have precipitation records dating back one hundred years or more.

Taking, for example, a forest tree which is some distance from a flowing stream, and one which receives no moisture from artificial sources, it is believed that the annual growth of this tree would bear a direct relation to the amount of precipitation which fell during the winter just prior to the growing season. The amount of growth made during each year may be determined by measuring the thickness of the tree's annular rings. The temperature during the growing season would have its effect upon the growth of the tree, and it is therefore not expected that the data obtained from measuring the thickness of annular rings would give reliable records for successive years where there is little variation in the annual precipitation. It seems reasonable to believe that the high, normal and low years can be determined. The Forest Service has cut a big tree from the Big Cottonwood drainage area, which lies about 10 miles southeast of Salt Lake City, Utah. This tree is between four and five hundred years old. A section will be cut and polished in order that the thickness of the annular rings may be easily measured. A thorough study will be made of the first sixty annular rings, and a comparison made with the 60-year record of the levels of Great Salt Lake. If a definite relation can be determined showing that a certain amount of precipitation produces a ring of certain thickness, this relation can then be applied back to the center of the tree and an estimate thereby secured for the annual precipitation for a period of four hundred to five hundred years. An effort will be made to complete this study during the next three months.

Any information concerning the progress of this work can be secured by writing or calling upon E. C. LaRue, district engineer, Water Resources branch, U. S. Geological Survey, Salt Lake City, Utah.

Fire Protection for Wooden Bridges in Canada.

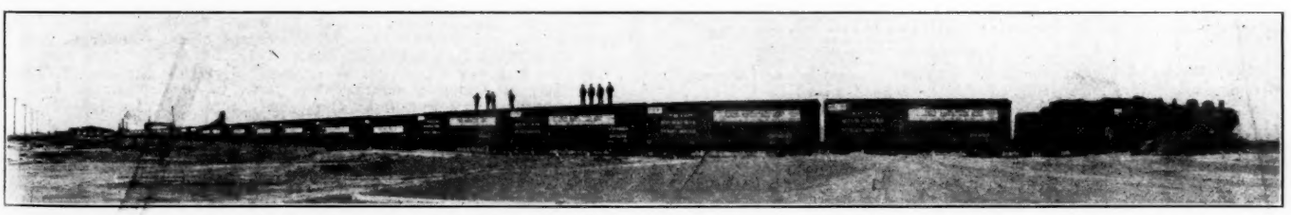
The Canadian board of railway commissioners has issued an order requiring and regulating the protection of wooden bridges from fire. It applies to all trestles the whole of which cannot be seen from an approaching train for a distance of at least 1,000 ft. During the months of May to October, inclusive, one of the following methods of protection must be enforced: Keeping watchmen at the structures; the track-patroling system; fire-alarm signals; ballast flooring; zinc covering of caps, stringers and batter posts; and the use of fireproof paint, equal in efficiency to a certain standard and applied at least once every five years. In addition water barrels must be kept at one end of trestles of less than 30 ft. in length, at both ends of trestles longer than 30 ft., with intermediate barrels at intervals of not more than 150 ft., except in the case of pile trestles over streams or other bodies of water. These barrels are to be kept filled with water, within ten inches of the top. The water barrels must be maintained in good repair, pails must be provided, and where watchmen or track-walkers are employed, pails must be carried by them during their inspections.

Where protection is provided by watchmen or by track-walkers, all trestles on the main line must be inspected at least twice every 24 hours, and on branch lines once every 24 hours. Brush and dead grass must not be allowed to accumulate around trestles. Railway companies failing to comply with these regulations will be subject to a fine of $30 for each offense, and watchmen or track-walkers who fail to make inspection in accordance with the regulations are liable to a fine of $15 for each offense. Where ballast flooring is the means of protection the ties must be completely covered with gravel level with the under side of the rail head. It is required that the fire-alarm signals must be equal in efficiency to the Montauk thermostat.

Seven Cars, $1,500,000; Thirty-Seven, 1,500,000 Lbs.

A short time ago the Chicago, Milwaukee & Puget Sound hauled from Seattle a train of Oriental silk which is believed to have been the largest of the kind ever shipped from Puget Sound. It filled seven cars, was valued at $1,500,000, and was destined to New York.

The accompanying illustration shows a train load of lumber hauled from Puget Sound by the same road recently, which is believed to have been the largest train load of lumber ever sent by a single shipper in a single train from the Pacific coast territory. The train consisted of thirty-seven box cars 42 ft. long, having a capacity 80,000 lbs. each, and the total weight of the contents of the cars was 1,500,000 lbs. The lumber was shipped by the Lumber Manufacturing Agency to dealers in various Eastern cities.



Chicago, Milwaukee & Puget Sound Lumber Train.

A Canadian Pacific Track-Walker.

A Galician, employed in the maintenance of way department at Telford, east of Winnipeg, while walking the track recently, making the usual Sunday inspection, discovered a piece of flange 18 in. long, which appeared to have been freshly broken off a wheel. He was some distance from a telegraph office; but a freight train was approaching, and quickly grasping the situation, he held the piece of flange up to the engineer's view. The engineman comprehended and he stopped his train at the first telegraph office; he notified the despatcher, who in turn called up the various stations, and stopped all freight trains then on the road, with a view to finding the car with the broken wheel. It was found on a train 50 miles from where the piece was picked

up, and was safely side-tracked. This intelligence of the section man and the prompt action of the engineman and the despatcher no doubt prevented a serious wreck, as the train was about to proceed over a crooked line. The Canadian Pacific gives credit to employees for meritorious acts, and it is found that a considerable number of such acts come to light every year. In this instance, the track-walker was given a money reward.

Hudson & Manhattan Proposal to Operate Tri-Borough Subway.

W. G. McAdoo, president of the Hudson & Manhattan, has sent to the New York State Public Service Commission a proposition for the operation of the proposed new subways in New York by his company and he offers to give a bond of a million dollars as an evidence of good faith; but as a condition he would require the city to provide two sections of underground railway which have not before been considered, and he would omit the northernmost extensions of the Lexington avenue line, presumably because they would not be profitable. At the same time he would recommend the omission of the Canal street line across the lower end of Manhattan. He estimates that on the whole the scheme as modified by his proposals would cost the city about one hundred millions. His company would provide the additional funds necessary for the equipment and operation, which he estimates at fifty millions. He would ask the city to make a subway from Thirty-third street and Sixth avenue southward through Broadway to Tenth street so that, in connection with the subway which is to be built to the Grand Central Terminal by his company, he could run trains of the Lexington avenue line around through this part of Broadway; and he would ask that an extension be built from the southern part of the Lexington avenue line, beginning at Church street, across the river to the Flatbush avenue station in Brooklyn and thence, by the line already proposed by the commission, through Lafayette avenue to Broadway, Brooklyn. Under this scheme there would be a line from the Bronx to Brooklyn parallel to and competing with the Interborough System, while at the same time the new system would closely connect with the present lines of the Hudson & Manhattan and thus tend to increase the business over the H. & M. to and from New Jersey. The work could be finished in about four years. The Hudson & Manhattan would operate under a fair contract, dividing the profits with the city after the payment of interest, taxes and a suitable sum for amortization.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.

American Association of Demurrage Officers.—A. G. Thomason, Scranton, Pa.; next meeting, June 22, 1911; Niagara Falls, N. Y.

American Association of General Passenger and Ticket Agents.—C. M. Burt, Boston, Mass.; next meeting, St. Paul, Minn., 1911.

American Association of Local Freight Agents' Association.—G. W. Dennison, Pennsylvania Co., Toledo, Ohio.

American Association of Railroad Superintendents.—O. G. Fetter, Carew building, Cincinnati, Ohio.

American Electric Railway Association.—H. C. Donecker, 29 W. 39th St., New York.

American Railway Association.—W. F. Allen, 24 Park Place, New York.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W., Chicago; Sept. 17-19, 1911; St. Louis, Mo.

American Railway Engineering and Maintenance of Way Association.—E. H. Fritch, Monadnock building, Chicago; March 21-23, 1911, Chicago.

American Railway Industrial Association.—G. L. Stewart, St. L. S. W. Ry., St. Louis, Mo.; May 6, 1911; Detroit, Mich.

American Railway Master Mechanics' Association.—J. W. Taylor, Old Colony building, Chicago; June 14-16, 1911, Atlantic City, N. J.

American Railway Tool Foremen's Association.—O. T. Harroun, Bloomington, Ill.

American Roadbuilders' Association.—Dec. 6-9; Indianapolis, Ind.

American Society for Testing Materials.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wednesdays, except July and August; annual, Jan. 18-19, New York.

American Society of Engineering Contractors.—D. J. Haner, 13 Park Row, New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 29th St., New York; annual, Dec. 6-9; New York.

Association of American Railway Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago; April 26, 1911; New Orleans, La.

Association of Railway Claim Agents.—J. R. McSherry, C. & E. I., Chicago; May, 1911; Montreal, Can.

Association of Railway Electrical Engineers.—G. B. Colegrove, I. C. R.R., Chicago.

Association of Railway Telegraph Superintendents.—P. W. Drew, 135 Adams St., Chicago; June 19, 1911; Boston, Mass.

Association of Transportation and Car Accounting Officers.—G. P. Conard, 24 Park Place, New York; Dec. 13-14, 1910, Chicago; June 20-21, 1911, Cape May City, N. J.

Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tuesday in month, except June, July and Aug.; Montreal.

Canadian Society of Civil Engineers.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays; Montreal, annual, last week January.

Car Foreman's Association of Chicago.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo, N. Y.

Civil Engineers' Society of St. Paul.—D. F. Jurgensen, 116 Winter St., St. Paul; 2d Monday, except June, July and Aug.; St. Paul.

Engineers' Society of Pennsylvania.—E. R. Dasher, Box 704, Harrisburg, Pa.

Engineers' Society of Western Pennsylvania.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday; annual, Jan. 17, 1911; Pittsburgh.

Freight Claim Association.—Warren P. Taylor, Rich., Fred. & Pot R.R., Richmond, Va.; 20th annual, June 21, 1911; St. Paul, Minn.

General Superintendents' Association of Chicago.—H. D. Judson, 209 East Adams St., Chicago; Wednesday preceding 3d Thursday; Chicago.

Indianapolis Railway and Mechanical Club.—B. S. Downey, C., H. & D., Indianapolis, Ind.

International Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York; next convention, Omaha, Neb.

International Railway Fuel Association.—D. B. Sebastian, La Salle St. Station, Chicago; May 15-18, 1911; Chattanooga, Tenn.

International Railway General Foremen's Association.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.

International Railway Master Blacksmiths' Association.—A. L. Woodworth, Lima, Ohio.

International Railway Congress.—Executive Committee, rue de Louvain, 11 Brussels; 1915, Berlin.

Iowa Railway Club.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.

Master Car Builders' Association.—J. W. Taylor, Old Colony building, Chicago; June 19-21, 1911, Atlantic City, N. J.

Master Car and Locomotive Painters' Association of United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept.; Boston.

New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.

North-West Railway Club.—T. W. Flannagan, Soo Line, Minn.; 1st Tues. after 2d Mon., except June, July, August; alternately at St. Paul and Minneapolis, Minn.

Northern Railway Club.—C. L. Kennedy, C., M. & St. P.; 4th Saturday; Duluth, Minn.

Omaha Railway Club.—A. H. Christiansen, Barker Blk.; second Wed.

Railway Club of Kansas City.—C. Manlove, 1008 Walnut St., Kansas City; 3d Friday in month; Kansas City.

Railway Club of Pittsburgh.—C. W. Alleman, P. & L. E., Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.

Railway Signal Association.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.

Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio; annual, May, 1911.

Richmond Railroad Club.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

Roadmasters' and Maintenance of Way Association.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.; Oct., 1911; St. Louis.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.

Society of Railway Financial Officers.—C. Nyquist, La Salle St. Station, Chicago.

Southern Association of Car Service Officers.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

Southern & Southwestern Railway Club.—A. J. Merrill, Prudential bldg., Atlanta, Ga.; 3d Thurs.; Jan., April, August and Nov.; Atlanta.

Toledo Transportation Club.—L. G. Macomber, Woolson Spice Co., Toledo; 1st Sat.; annual, May 6, 1911; Toledo.

Transportation Club of Buffalo.—J. M. Sells, Buffalo; 1st Sat. after 1st Wed.; annual, Dec. 13, 1910; Buffalo, N. Y.

Traffic Club of New York.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August; New York.

Traffic Club of Pittsburgh.—T. J. Walters, Oliver building, Pittsburgh, Pa.; meetings monthly; Pittsburgh.

Train Despatchers' Association of America.—J. F. Mackie, 7042 Stewart Ave., Chicago; annual, June 20, 1911; Baltimore, Md.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.

Western Canada Railway Club.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August; Winnipeg.

Western Railway Club.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

Wood Preservers' Association.—F. J. Angier, First National Bank bldg., Chicago; annual, Jan. 17-19, 1911; Chicago.

The only railway in Nicaragua is the National Railroad of Nicaragua, owned by the government but leased to a German. The terms of the lease provide that 25 per cent. of the gross earnings of the road shall be paid to the government, 10 per cent. shall be used to pay for repairs, and the remainder goes to the holder of the lease, who must pay from his share the operating and administrative expenses of the road.

Traffic News.

The Pennsylvania Railroad, beginning this week, will run an agricultural special instruction train over the Bedford division, carrying lecturers from the School of Agriculture of the State College.

Western and southwestern railways have informed the manufacturing and jobbing interests of Chicago, through the Chicago Association of Commerce, that they will no longer allow the usual reductions in passenger rates for conventions and expositions.

The Traffic Club of New York will hold its annual meeting for the election of officers at the Waldorf on Tuesday evening, November 29. After the conclusion of the business there will be an entertainment and a luncheon. The ticket reported by the nominating committee proposes the following candidates for the ensuing year: For president, F. E. Herriman; for vice-presidents, E. G. Warfield, Colin Studds, W. J. Harahan, W. G. Sickel, Chas. F. Tuttle; for treasurer, F. C. Earle; for secretary, C. A. Swope; for assistant secretary, H. L. Derby; for members of board of governors to serve three years, C. F. Seegar, F. E. Stoddard, L. F. Vosburgh; for member of board of governors to fill unexpired term of E. C. Warfield, resigned, one year, E. C. Weekes.

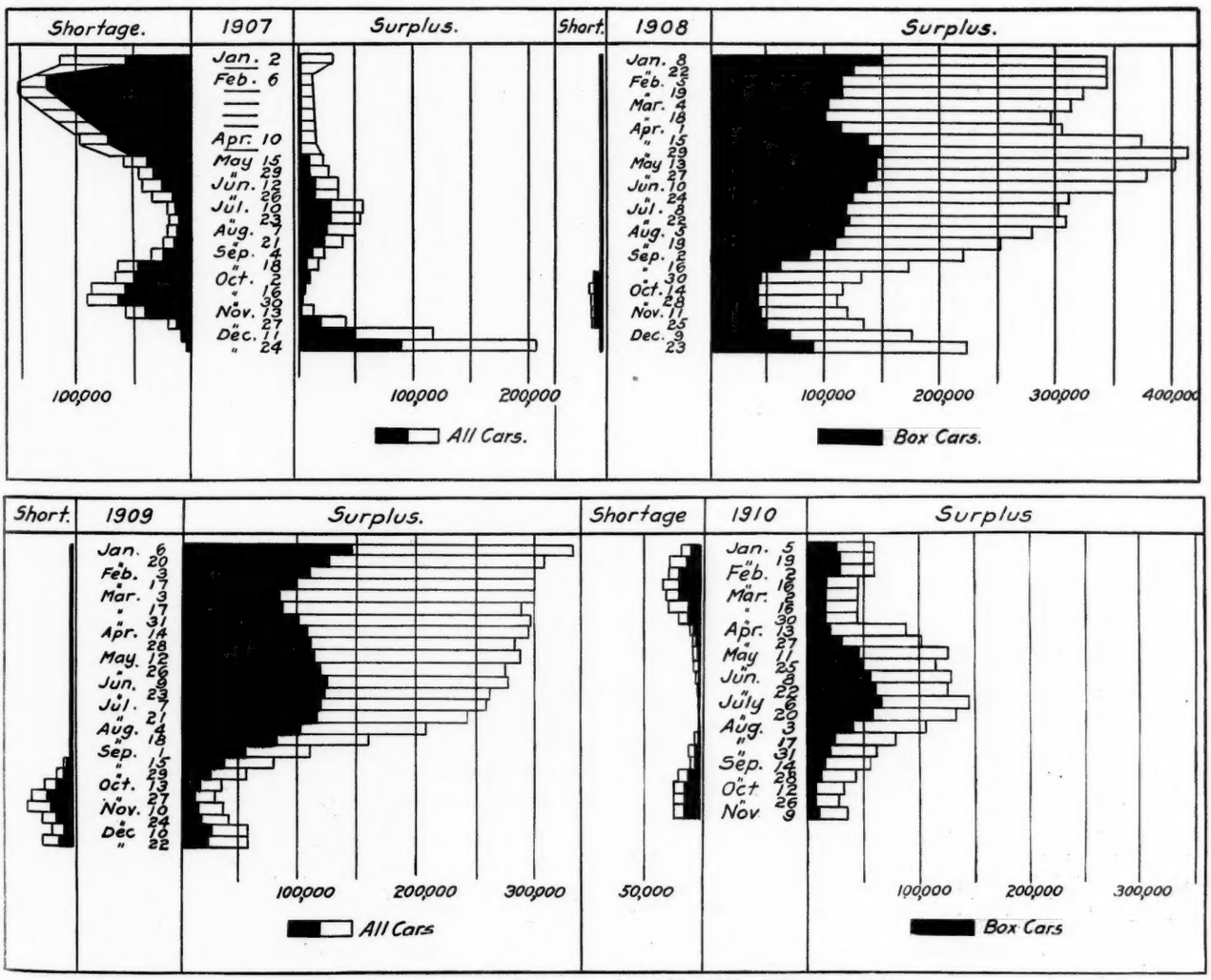
Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railways of The American Railway Association, in presenting

CAR SURPLUSES AND SHORTAGES.

Date.	No. of roads.	Surpluses: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Shortages: Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—November 9, 1910	8	21	170	366	220	777	140	159	150	138	587
" 2.— " 9, 1910	23	751	99	469	5,970	7,289	293	0	1,139	125	1,557
" 3.— " 9, 1910	24	885	244	377	1,817	3,323	1,685	0	670	662	3,017
" 4.— " 9, 1910	9	153	81	326	310	870	1,220	259	1,030	0	2,509
" 5.— " 9, 1910	17	0	0	30	10	40	2,606	702	1,124	46	4,478
" 6.— " 9, 1910	20	6,502	634	1,487	4,040	12,663	134	60	914	328	1,436
" 7.— " 9, 1910	4	68	34	146	124	372	113	0	0	117	230
" 8.— " 9, 1910	14	124	14	528	1,752	2,418	1,975	120	354	64	2,513
" 9.— " 9, 1910	12	522	95	57	444	1,118	679	85	123	50	937
" 10.— " 9, 1910	21	743	711	1,173	2,774	5,401	1,972	65	11	465	2,513
" 11.— " 9, 1910	4	45	99	22	144	310	1,142	0	0	81	1,223
Total	156	9,814	2,181	4,981	17,605	34,581	11,959	1,450	5,515	2,076	21,000

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland, and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia, and Florida lines; Group 6—Iowa, Illinois, Wisconsin, Minnesota and the Dakotas lines; Group 7—Montana, Wyoming and Nebraska lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Oregon, Idaho, California and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages in 1907, 1908, 1909 and 1910.

statistical bulletin No. 83, giving a summary of car shortages and surpluses by groups from July 7, 1909, to November 9, 1910, says:

"There is an increase of 5,450 in the surplus, making the total 34,581 cars. The largest increase is 4,533 in the miscellaneous column, which is made up chiefly of coke cars in group 2 (Eastern), and stock in groups 6 (Northwestern), 8 (Middle Western), and 10 (Pacific). There was also some increase in box surplus in the West and Northwest, partially offset by decreases in the Eastern and central groups. The coal car surplus decreased 797 cars, the largest item being in group 2 (Eastern).

"There was a decrease in the shortage of 896 cars, the items of change in general reflecting the changes on the surplus side.

"It will be noted that the increase in surplus is setting in at exactly the same period as last year, and that the amount of the increase for this report is almost identical with that for the corresponding period in 1909. The total surplus this year, however, is slightly lower than last year, having been 36,616 on November 10, 1909, as against 34,581 for this report."

The accompanying table gives surpluses and shortages by groups for the last period covered by the report and the diagrams show total surpluses and shortages in 1907, 1908, 1909 and 1910.

INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission has granted the railways additional time to reply to the inquiry recently submitted regarding value and financial administration of the properties. On questions 1 to 4 the time for reply has been extended to December 5, and on questions 5 to 7 until January 5. Questions 5 to 7 of the commission's inquiry circular require the railways concerned in the applications for higher rates to furnish the commission with full details respecting stock and bond issues since the creation of the respondent companies, including all expenses of preparation and sale, the terms of all contracts with bankers or syndicates, amount of all fees, commissions, etc., proceeds in cash, property, securities or services of all security issues; the interest and dividend payments and all other disbursements to holders of the company's bonds and stocks; rights of subscription and their market quotations; application of earnings or profits in each year to purchase of equipment, other additions and betterments, sinking funds and other purposes, specifying each.

Reparation Awarded.

Webster Grocer Company v. Chicago & North Western et al. Opinion by Commissioner Cockrell:

Joint rate in excess of sums of separately established rates. (19 I. C. C., 493.)

Hanley Milling Co. v. Pennsylvania Company et al. Opinion by Commissioner Clark:

On the facts complainant is entitled to reparation because defendants negligently failed to comply with complainant's request for reconsignment of one carload of hay. (19 I. C. C., 475.)

Complaint Dismissed.

Paragon Plaster Co. v. New York Central & Hudson River et al. Opinion by Commissioner Clements:

Rates collected on carload shipments of wall plaster from Syracuse, N. Y., to Boston, Mass., and New York, N. Y., not found unreasonably high.

S. Shoecraft & Son v. Illinois Central et al. Opinion by Commissioner Prouty:

Following *Blinn Lumber Company v. Southern Pacific Company*, 18 I. C. C. Rep., 430, consideration of this claim is barred by the statute of limitations. (19 I. C. C., 492.)

Griffen H. Deeves Lumber Co. v. Chicago & North Western et al. Opinion by Commissioner Cockrell:

1. The fact that over nine months after shipment moved defendant provided for absorption of switching charge, held not sufficient in itself to justify a finding that the charge was unreasonable.

2. Complaint of unreasonable charges on shipment from Greenville, Mo., to Foodhouse, Ill., and on shipment from Dothan, Ala., to Chicago, Ill., not sustained. (19 I. C. C., 482.)

Wells-Higman Company v. Grand Rapids & Indiana Railway Company et al. Opinion by Commissioner Cockrell:

Joint rebate in excess of combination. Reparation awarded. Shipment Metropolis, Ill., to Chicago, Ill., reconsigned to Lawton, Mich. Reconsigning instructions given to carrier not participating in original movement; held, that two separate movements resulted, the first intrastate and the second interstate. Carriers participating in interstate movement not made parties defendant. Complaint dismissed. No overcharge shown for transportation within the jurisdiction of commission. (19 I. C. C., 487.)

Time Limit on Redemption of Unused Coupons.

T. A. Rickel v. Atchison, Topeka & Santa Fe. Opinion by Commissioner Harlan:

Without considering the question of the legality of the use by interstate carriers of so-called exchange scrip books, the commission holds that because of the defects of the tariff under which such books were sold by the defendant the provision therein limiting the right of the purchaser to demand redemption of unused coupons to a period of eighteen months was not valid. Reparation awarded the complainant for his unused coupons, although presented for redemption after the said period had expired. (19 I. C. C., 499.)

Progress of Hearings and Suspensions of Tariffs.

The Interstate Commerce Commission resumed its hearings on the proposed trunk line freight rate increases at Washington on Monday of this week. The first testimony was that of William A. Glasgow, H. K. Hathaway and James M. Dodge, all of Philadelphia, who told how by the introduction of scientific methods in their factories they had been able to produce greatly improved results with fewer men and at a reduction in cost. This testimony was prefaced by a long statement from Mr. Brandeis, attorney for the shippers, who said that he was going to show how the railways could provide for all of their increased expenses, on account of labor or because of the higher cost of materials, by the introduction of economies in management and operation.

Joseph Ramsey, president of the Ann Arbor Railroad, made a general statement concerning the necessity of increased income, of the same nature as the statement heretofore made by Messrs. McCrea, Willard and others.

Many prominent roads appeared at the hearing to ask relief from some of the requirements of the commission in its recent order asking for a great mass of information relative to the capitalization and financial history of the companies.

The Interstate Commerce Commission has suspended until April 10, 1911, tariffs filed by the Rock Island and other lines west of the Mississippi river showing increased rates on live stock. These tariffs will be considered with other live stock tariffs which have been issued in the same territory and which were suspended sometime since.

The commission has suspended until January 5 tariffs filed by the Kansas City Southern and other railways showing increased rates on second-hand locomotives.

The commission will begin its hearing on the long and short haul clause at Washington next Monday.

Decision on Long and Short Haul Question Postponed.

Colorado Coal Traffic Association v. Colorado & Southern et al. Opinion by Commissioner Clements:

Apart from the charge of deviation from the long-and-short section, no question is herein involved that was not disposed of in *Cedar Hill Coal & Coke Company v. C. & S. Ry. Co.*, 16 I. C. C., Rep. 387. Whatever may be the merit of complainant's contention regarding the long-and-short-haul feature of the controversy, no order at this time will be made by the commission in respect thereto for the reason that following the language in the first part of the amended fourth section of the act, approved June 18, 1910, prohibiting a greater charge for a shorter than for a longer haul when over the same line in the same direction, it is provided—that no rates or charges lawfully existing at the time of the passage of this amendatory act shall be required to be changed by reason of the provisions of this section prior to the expiration of six months after the passage of this

act, nor in any case where application shall have been filed before the commission, in accordance with the provisions of this section, until a determination of such application by the commission. This complaint will therefore be dismissed. (19 I. C. C., 478.)

Exception to Demurrage Rules in New England.

In the matter of the investigation and suspension of certain demurrage schedules. Opinion by Commissioner Lane:

In November, 1909, the National Convention of Railway Commissioners adopted a code of uniform demurrage rules. This action was based on extensive investigation and thorough discussion, participated in by railway commissions, commercial organizations, representatives of railways, and individual shippers from all parts of the country. The deliberations of the committee having the matter in charge were presided over by a member of the Interstate Commerce Commission, who submitted the report recommending the adoption of the code.

This commission, believing it to be of first importance that uniform demurrage rules should be observed throughout the United States, except in so far as local conditions might interfere, recommended carriers to apply this uniform code to interstate business, and following this recommendation the railways of New England filed schedules with this commission making these rules effective October 1, 1910. As soon as these tariffs were filed the commission began to receive numerous vigorous protests against the putting into effect of these schedules, claiming that conditions in New England differed from those elsewhere, and that the establishment of these rules would work much hardship. Desiring to proceed with great caution, we suspended the effective date of these tariffs for thirty days and assigned the matter for hearing at Boston on October 17, last.

Two members of the commission attended that hearing, which extended over two days. We found an earnest and aggressive sentiment against these new demurrage regulations, begotten, without doubt, of an honest belief that their operation would entail much hardship. In the past New England has enjoyed a demurrage free time of ninety-six hours, which is reduced by these rules to forty-eight hours. The testimony before us indicated that the average shipper had not looked beyond this fact, and believed that the only effect of these new rules was to divide in half his free time.

In point of fact, this is not true. The new rules contain many provisions of advantage to the shipper not found in the schedule at present in force. They contain, for example, a bunching provision, relieving against hardship from the irregular delivery of cars; an average provision by which shippers may gain, through the prompt unloading of cars, credits which are applied against overtime in the unloading of other cars; a weather provision which is of much importance in New England. It is our belief that the new rules, applied in a proper spirit, will result in less inconvenience to and in the payment of less demurrage charges by the shippers of New England than under the old regulations.

We also found certain local conditions in New England which differed to some extent from other sections of the country, but it is uncertain, from the testimony given, just how far, if at all, these conditions require a departure from the rules elsewhere in effect. We feel that, in the main, New England should be able to operate under the same demurrage code which prevails in other parts of the United States and in the Dominion of Canada; but we desire to be certain of our ground before taking final action.

From a consideration of the entire situation we think that the first necessity is the establishment of a demurrage officer in this territory who will give construction to these rules and enforce them impartially and fairly as between the shippers and the carriers. We have to this end suggested to the carriers the name of a man in whom we have confidence, to whom doubtful questions will be referred by both carriers and shippers. This officer will have access to the carriers' records, and will report the working of the rules to the commission.

The effective date of these schedules has been a second time suspended until December 1, 1910. We recommend that for six months following that date the free time upon lumber and forest products, coal, grain and grain products be extended from forty-eight hours to seventy-two hours, provided, however, that the application of the average rule shall only be allowed upon a forty-eight-hour basis. Before the expiration of that period the commission will be able to intelligently determine what commodities, if any, should be given a longer free time than the standard forty-eight hours.

The shippers of New England should understand that this uniform demurrage code was only adopted after the most careful consideration. The business of a railway is transportation, not storage. The service of a railway cannot be efficient unless its cars are promptly released. If a car is detained by a particular shipper for a longer period than is necessary for loading or unloading, the efficiency of the railway is to that extent diminished, and every other shipper is to the same extent prejudiced. We urge that shippers coöperate in giving a fair and intelligent trial to these regulations. If it turns out that under the peculiar conditions of New England their application results in undue hardship, the rules themselves will be modified; the present recommendations are understood, however, to be purely tentative, awaiting fuller and more precise information upon the New England situation. (19 I. C. C., 496.)

COURT NEWS.

Important Decision in Louisiana Regarding Sugar Cane Rates.

The supreme court of Louisiana has rendered a decision holding unjust and unreasonable and annulling rates on sugar cane fixed by the Louisiana railway commission on August 6, 1906. The rates on sugar cane were originally placed at a low figure by the railways in order to develop the industry. The commission still further reduced these rates, and the Southern Pacific (Morgan's Louisiana & Texas Railroad and Steamship Co. and the Louisiana Western) contested its action.

The original rates of the railways were made some ten or fifteen years ago. Some of the sugar people in Louisiana had conceived the idea of building large central factories and then consolidating the large tonnage of sugar cane manufactured into sugar instead of following the method followed since the settlement of the country of having an independent sugar factory on each plantation. It was to enable manufacturers to carry out these plans that the railways made the original reductions in rates, and the central refinery plan was in consequence carried out, and the result has been that under the rates made the sugar manufacturers constantly have prospered. It was in spite of this fact, and of the fact that the cost of operating railways had increased since the rates had been fixed, that the commission reduced them. In rendering its decision the supreme court laid down a number of important principles. The following is a summary of them:

The freight rates charged in one state have no bearing on those charged elsewhere, unless the conditions are shown to be the same, and it was not shown that the conditions were the same in Louisiana and in Texas and Wisconsin, with whose rates those in Louisiana were compared.

No rate could be held to be reasonable or just only on the basis of the total earnings of the carriers. Furthermore, where the railway derives its revenue from both interstate and state business, a state cannot predicate the rates it fixes on earnings derived from interstate business.

A reduced rate on a particular commodity cannot be said to be reasonable or just when made without regard to rates on other commodities or to whether it will pay the cost of the service or yield a fair return, even though it be held by state and federal courts that requiring of a road to haul a commodity for less than cost is not a taking of property without due process so long as the company gets a fair revenue from the whole of its intrastate business. The courts of Louisiana need hold that a rate to be unreasonable or unjust within the meaning of the Louisiana constitution must also violate the fourteenth amendment of the federal constitution.

Where rates are fixed on a particular commodity, the only question is whether they produce a revenue—first, sufficient to pay the actual cost of the service, and second, to yield a fair return over operating expenses. For certain companies the carrier hauls both the raw and manufactured material, and in such cases the loss on transporting the one may be made good by the gain from hauling the other.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1910. (SEE ALSO ISSUES NOVEMBER 11 AND 18.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama Great Southern	309	$254,833	$94,199	$377,789	$45,835	$76,730	$10,870	$109,501	$8,206	$251,142	$126,647	—$935	$15,005	$110,707	$34,764
Atlantic City	166	64,555	137,476	214,203	21,484	10,450	3,563	95,122	941	131,560	82,643	—4,207	7,000	71,436	19,940
Bessemer & Lake Erie	204	861,723	45,935	915,393	89,800	138,419	8,322	225,191	7,382	469,114	446,279	.....	7,000	439,279	—75,475
Central New England	277*	218,004	40,732	271,706	51,169	22,372	2,170	78,760	3,106	157,577	114,129	.....	9,000	105,129	—4,201
Central Vermont	536	224,015	124,697	376,619	55,743	45,165	7,602	140,860	7,214	256,584	120,035	1,344	10,750	110,629	4,467
Chicago & Alton	998	811,238	413,753	1,314,818	219,915	185,651	36,566	474,805	30,778	947,715	367,103	—522	37,300	329,281	—220,406
Chicago & Erie	269	354,638	78,038	466,088	56,467	95,969	27,229	188,455	10,536	378,656	87,432	.....	11,387	76,045	—6,004
Chicago, Indiana & Southern	329	232,787	29,693	269,734	44,801	55,645	8,961	119,923	8,397	237,727	32,007	41	13,575	18,473	—46,453
Chicago, Rock Island & Gulf	471†	171,917	62,077	250,648	44,499	17,251	8,955	82,563	4,142	161,410	89,238	—439	4,613	84,186	17,334
Cincinnati, New Orleans & Texas Pacific	337	619,750	149,560	806,652	80,491	135,886	20,405	198,887	16,531	452,200	354,452	—173	24,500	329,779	75,893
Cleveland, Akron & Columbus	212	179,504	57,688	251,530	48,955	36,558	3,077	79,236	3,189	171,015	80,515	.....	6,000	74,515	576
Cumberland Valley	162	215,034	62,767	288,840	37,815	35,023	4,663	81,859	6,454	165,814	123,026	274	5,993	117,307	1,544
Duluth & Iron Range	168	1,108,617	23,044	1,138,619	99,755	61,905	437	180,146	8,687	350,930	787,689	5,108	45,885	746,912	—293,475
Duluth, Missabe & Northern	293	1,757,857	40,061	1,804,892	109,700	119,444	1,824	221,591	10,363	462,922	1,341,970	17,901	73,102	1,286,769	—67,195
Evansville & Terre Haute	310	161,503	71,114	256,351	30,743	32,695	6,426	74,588	6,065	150,517	105,834	—854	9,410	95,570	7,468
Florida East Coast	583	105,876	63,890	193,627	43,917	37,346	4,176	79,629	6,506	171,574	22,053	.....	13,731	8,322	10,301
Grand Trunk Western	347	308,639	191,484	534,857	74,203	70,164	17,431	196,292	12,299	370,389	164,468	—553	31,697	132,218	—18,210
Kanawha & Michigan	175	271,410	36,340	313,402	29,001	46,341	2,099	72,627	6,404	156,472	156,930	—20	8,178	148,732	87,243
Long Island	390	254,172	635,842	927,325	100,779	110,948	15,726	415,361	18,705	662,519	264,806	91,432	43,570	312,668	—73,376
Morgans La. & Tex. R. R. & S. S. Co.	348	270,009	94,721	380,745	60,124	48,461	10,480	131,106	12,569	262,740	118,005	—1,122	17,756	99,127	15,023
New York, Philadelphia & Norfolk	112	229,279	40,051	290,224	35,122	46,336	4,580	101,185	11,839	199,062	91,162	.....	7,450	83,712	—16,527
New York, Susquehanna & Western	185	164,208	57,533	248,327	39,001	23,677	1,491	87,676	6,046	157,891	90,436	2,091	11,771	80,756	9,714
Norfolk Southern	602	143,012	68,041	227,880	27,702	27,278	5,504	68,902	12,830	142,216	85,664	—243	6,100	79,321	—
Northern Central	471	829,387	225,379	1,112,836	150,897	192,521	15,991	487,623	26,708	873,740	239,096	837	31,232	208,701	—5,720
Northwestern Pacific	376	147,779	158,233	328,343	46,145	41,963	2,626	112,699	9,071	212,504	115,839	.....	10,500	105,339	—5,314
Peoria & Eastern	351	258,901	79,293	363,304	46,759	52,551	6,212	125,152	5,089	235,763	127,541	.....	10,000	117,541	16,742
Pittsburgh & Lake Erie	191	1,342,499	145,559	1,537,470	188,027	129,839	15,570	324,644	22,303	680,383	857,087	—241	27,200	829,646	—111,680
Rutland	468	159,351	142,851	340,018	47,587	41,854	5,013	114,179	7,624	216,257	123,761	.....	11,215	112,546	4,067
San Antonio & Aransas Pass	724	361,802	107,304	488,215	51,338	62,225	5,338	131,043	9,578	259,522	228,693	.....	9,000	219,693	32,773
Texas & New Orleans	458	204,664	84,987	307,219	51,005	41,572	6,810	112,460	9,126	220,973	86,246	773	12,182	74,837	—4,097
Toledo & Ohio Central	444	411,575	76,024	516,241	66,494	58,655	7,149	130,026	7,829	270,153	246,088	.....	16,022	230,066	67,467
Toledo, St. Louis & Western	450	261,450	44,094	326,008	52,969	40,575	8,842	107,318	9,184	218,888	107,120	.....	13,900	93,220	—12,847
Virginian	374‡	279,035	26,386	313,521	33,174	50,716	4,941	76,266	8,101	173,198	140,323	861	14,000	127,184	83,421
West Jersey & Seashore	353	158,649	442,314	647,393	94,081	73,456	19,044	237,701	10,785	435,067	212,326	—7,022	22,773	182,531	11,825
Western Maryland	543	530,395	106,411	665,658	85,478	81,757	10,584	209,154	12,544	399,517	266,141	260	19,500	246,901	—
Wheeling & Lake Erie	457	539,670	54,213	640,040	83,430	110,443	9,323	212,584	13,935	429,715	210,325	3,084	21,400	192,009	—2,640
THREE MONTHS OF FISCAL YEAR, 1911.															
Alabama Great Southern	309	$715,706	$312,565	$1,117,810	$140,738	$251,203	$32,700	$328,593	$25,807	$779,041	$338,769	—$2,112	$38,049	$298,608	$91,674
Atlantic City	166	207,708	608,578	850,705	63,496	32,512	12,463	336,331	4,946	449,748	400,957	—18,954	21,000	361,003	56,918
Bessemer & Lake Erie	204	2,552,020	142,560	2,721,827	267,189	385,432	26,445	661,303	23,544	1,363,913	1,357,914	.....	21,000	1,336,914	—202,673
Central New England	277*	620,813	111,298	772,241	185,287	65,051	5,854	224,822	8,703	489,717	282,524	.....	27,000	255,524	—24,104
Central Vermont	536	574,829	347,654	1,000,435	151,373	131,999	23,124	420,463	20,553	747,512	252,923	3,616	31,616	224,923	—89,718
Chicago & Alton	998	2,435,191	1,245,810	3,946,454	530,738	567,049	112,962	1,346,866	98,003	2,655,618	1,290,836	—7,122	111,900	1,171,814	—303,547
Chicago & Erie	269	998,599	231,870	1,332,441	172,185	273,593	65,398	534,463	28,513	1,074,152	258,289	.....	33,711	224,576	51,438
Chicago, Indiana & Southern	329	667,947	90,335	779,575	133,636	159,153	29,726	324,539	28,060	675,114	104,461	748	40,725	64,484	—91,505
Chicago, Rock Island & Gulf	471†	446,330	184,116	678,133	135,629	48,817	26,373	248,863	23,316	482,998	195,135	—1,046	17,819	176,270	—81,619
Cincinnati, New Orleans & Texas Pacific	337	1,826,635	442,435	2,384,410	246,093	381,454	63,361	623,703	51,521	1,366,132	1,018,278	—0,656	64,500	953,122	265,554
Cleveland, Akron & Columbus	212	503,535	176,209	723,816	145,174	108,504	10,514	226,327	12,367	502,886	220,930	.....	18,000	202,930	34,777
Cumberland Valley	162	602,205	186,298	819,802	97,363	102,887	14,216	238,973	17,518	470,957	348,845	955	16,903	332,897	16,665
Duluth & Iron Range	168	3,495,555	72,203	3,594,055	330,523	195,994	1,639	526,867	25,693	1,080,716	2,513,339	19,184	145,096	2,387,427	—622,209
Duluth, Missabe & Northern	293	5,688,646	127,650	5,840,725	304,573	334,605	5,070	684,255	33,382	1,361,885	4,478,840	47,625	235,774	4,290,691	24,204
Evansville & Terre Haute	310	484,468	201,448	753,588	91,263	90,527	18,128	221,969	18,453	440,340	313,248	—2,605	28,230	282,413	22,320
Florida East Coast	583	307,707	197,310	583,641	129,728	117,550	13,422	248,978	23,359	533,037	50,604	.....	41,194	9,410	18,922
Grand Trunk Western	347	725,460	576,631	1,408,348	167,779	227,878	53,477	568,496	34,546	1,052,176	356,172	—1,996	95,092	259,084	—176,047
Kanawha & Michigan	175	772,130	101,734	891,323	104,042	142,425	8,346	223,584	18,853	497,250	394,073	—29	23,772	370,272	155,126
Long Island	390	765,130	2,248,654	3,147,083	317,746	333,903	54,580	1,220,488	58,598	1,985,315	1,161,768	308,350	130,711	1,339,407	—106,792
Morgans La. & Tex. R. R. & S. S. Co.	348	270,009	94,721	380,745	60,123	48,461	10,480	131,106	12,569	262,740	118,005	—1,122	17,756	99,127	20,823
New York, Philadelphia & Norfolk	112	229,279	40,051	290,224	35,122	46,336	4,580	101,185	11,839	199,062	91,162	.....	7,450	83,712	—31,103
New York, Susquehanna & Western	185	469,033	182,299	728,738	105,915	71,150	8,609	266,384	14,412	466,470	262,268	—14,614	34,859	212,795	24,466
Norfolk Southern	602	412,906	222,319	692,005	87,256	83,143	15,434	207,651	39,505	432,991	259,014	4,799	18,300	245,513	—
Northern Central	471	2,353,567	665,938	3,196,016	449,218	562,554	52,845	1,430,949	71,175	2,566,741	629,275	2,474	93,696	538,053	—36,276
Northwestern Pacific	376	427,755	579,188	1,073,920	143,140	120,943	8,735	327,693	27,102	627,613	446,307	.....	31,500	414,807	46,085
Peoria & Eastern	351	699,947	207,463	974,583	138,827	150,723	21,110	353,423	17,247	681,330	293,253	.....	30,000	263,253	—13,020
Pittsburgh & Lake Erie	191	4,066,059	479,141	4,670,307	539,619	396,911	44,842	1,006,092	71,875	2,059,339	2,610,968	—851	81,600	2,528,517	—142,529
Rutland	468	472,330	382,441	966,771	143,358	120,841	23,468	322,080	19,736	629,483	337,288	.....	33,226	304,062	—3,447
San Antonio & Aransas Pass	724	827,194	309,343	1,195,721	152,513	147,216	14,976	369,175	28,280	712,160	483,561	.....	27,000	456,561	124,417
Texas & New Orleans	458	616,982	261,032	933,136	162,210	154,768	20,838	332,004	27,721	697,541	235,595	1,234	36,546	200,283	—43,243
Toledo & Ohio Central	444	1,191,911	209,246	1,485,057	183,228	177,699	21,652	427,081	25,387	835,047	650,010	.....	46,859	603,151	188,043
Toledo, St. Louis & Western	450	775,058	143,496	979,094	134,625	119,249	25,525	323,281	28,233	630,913	348,181	.....	41,700	306,481	—28,999
Virginian	374‡	734,191	78,400	834,928	94,310	134,314	17,566	211,712	23,041	480,943	353,985	2,241	40,000	316,226	219,930
West Jersey & Seashore	353	509,879	1,726,400	2,361,661	284,930	217,416	57,505	728,115	29,931	1,317,897	1,043,764	—26,019	68,319	949,426	44,266
Western Maryland	543	1,554,079	363,772	2,003,357	265,100	217,604	35,140	614,568	37,412	1,169,824	833,533	507	58,500	775,539	—
Wheeling & Lake Erie	457	1,642,131	189,736	1,968,008	251,514	320,402	28,133	623,723	40,541	1,264,313	703,695	9,936	64,680	648,951	107,996

Mileage operated on September 30, 1909.—* 294 miles; † 529 miles; ‡ 444 miles; — indicates Deficits, Losses and Decreases.

Railway Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

W. E. Goodnow, claim adjuster of the Rock Island Lines at Topeka, Kan., has been appointed claim agent of the Kansas City Terminal Railway, with office at Kansas City, Mo.

S. W. Patton has been appointed claims agent of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn. He will have charge of fire, freight and personal injury claims.

The officers of the Sparks Western are now as follows: Col. J. M. Wilkinson, president, Valdosta, Ga.; E. L. Bemiss, vice-president, and R. Fleet, secretary and treasurer, both of Augusta. Mr. Wilkinson is third vice-president; Mr. Bemis, second vice-president, and Mr. Fleet, treasurer, of the Georgia & Florida.

C. C. Wright, assistant attorney of the Chicago & North Western lines west of the Missouri river at Omaha, Neb., has been appointed general solicitor, with office at Chicago. He will act as immediate assistant to the general counsel, and will have active charge of cases before the Interstate Commerce Commission.

Operating Officers.

W. C. Bassett has been appointed assistant superintendent of telegraph of the Atchison, Topeka & Santa Fe Coast Lines, with office at Los Angeles, Cal., succeeding G. A. Lawrence.

The office of special agent of the Louisiana division of the Rock Island Lines has been abolished, and the jurisdiction of R. M. Clary, special agent of the Arkansas division has been extended over the Louisiana division. H. Fairmon has been appointed a trainmaster on the Louisiana division, succeeding F. O. Whiteman, transferred.

John A. McGrew, whose appointment as superintendent of the Saratoga and Champlain divisions of the Delaware & Hudson, with office at Albany, N. Y., has been announced in these columns, was born June 8, 1873, at Bridgewater, Ohio. Mr. McGrew graduated from the Ohio State University with the degree of civil engineer, in June, 1895, and completed a post-graduate course at the same university in November, 1896. He began railway work in June, 1894, with the Columbus & Westerville Electric Railway, at Columbus, remaining with that company until October of the same year. In 1895 he again entered the service of this company, and for about six months he was assistant superintendent of construction. From November, 1896, to August, 1899, he was an assistant on the engineering corps of the C. & P. division of the Pennsylvania Lines at Wellsville, Ohio, and Columbus. In August, 1899, he was appointed assistant engineer maintenance of way of the Logansport division of the Pittsburgh, Cincinnati, Chicago & St. Louis, at Logansport, Ind., and in January, 1901, was promoted to engineer maintenance of way. In April, 1903, he was appointed engineer maintenance of way of the Eastern division of the Pittsburgh, Fort Wayne & Chicago, now a part of the Pennsylvania company, remaining in that position until May of the following year, when he went to the Rock Island as a special agent in the general manager's office at Chicago. He was out of railway work from November, 1904, to September, 1909, and since that time was inspector maintenance of way, of the D. & H., the Quebec, Montreal & Southern, the Hudson Valley Railway and the United Traction Company.

John A. McGrew.

C. F. Merrill, assistant superintendent of the Central Railroad of New Jersey, at Mauch Chunk, Pa., has been appointed superintendent of the Lehigh & Hudson River, succeeding L. W. Berry, resigned to go to another company. Mr. Merrill received his education at Phillipsburg Academy, at Andover, N. J., and at Amherst College. He is a son of W. F. Merrill, former first vice-president of the New York, New Haven & Hartford. He began railway work in the engineering department of the Indiana, Illinois & Iowa, and then went to the Philadelphia & Reading, with office at Harrisburg, Pa. Mr. Merrill has been with the Central Railroad of New Jersey for the past eight years on the Lehigh & Susquehanna division, holding various positions in the operating department, which he now leaves to become superintendent of the Lehigh & Hudson River.

L. W. Berry, whose appointment as superintendent of the New York & Long Branch, with office at Long Branch, N. J., has been announced in these columns, began railway work in 1878, as operator and agent of the Chicago & Alton. From 1880 to the spring of 1881 he was operator of the Chicago, Burlington & Quincy, and was then despatcher until July, 1899. He was appointed superintendent of the St. Louis division of the same road in 1899, remaining in that position for six years, and he was then for one year inspector of transportation of the Toledo, St. Louis & Western. In 1906, he went to the Lehigh & Hudson River, and at the time of his recent appointment was superintendent of that company, which position he now leaves to become superintendent of the New York & Long Branch, succeeding former Senator Rufus Blodgett, deceased.

Traffic Officers.

W. S. Williams, commercial agent of the Rock Island Lines at Cedar Rapids, Iowa, has been appointed a general agent, with office at Spokane, Wash.

G. M. Jackson, ticket passenger agent of the Canadian Pacific at San Francisco, Cal., has been appointed general agent, passenger department, with office at San Francisco.

M. M. Hogan has been appointed Florida freight agent of the St. Louis & San Francisco, the Chicago & Eastern Illinois and the Evansville & Terre Haute, with office at Jacksonville, Fla.

R. C. McKelley, traveling freight agent of the American Refrigerator Transit Company at Milwaukee, Wis., has been appointed general agent, with office at Kansas City, Mo., succeeding Fred Wemhoener, resigned.

Russell Houston, soliciting agent of the Louisville & Nashville, at Louisville, Ky., has been appointed general freight and passenger agent of the Alabama, Tennessee & Northern and the Tombigbee Valley, with office at Mobile, Ala.

George L. Williams has been appointed a general agent of the Chicago Great Western, with office at Fargo, N. D., succeeding H. S. Jones, resigned to go into other business, and E. D. Forde has been appointed general agent, freight department, with office at Pittsburgh, Pa.

H. B. Holbert, division freight agent of the Chicago Great Western at St. Paul, Minn., having been transferred to Des Moines, Iowa, the territory under his jurisdiction at St. Paul (from Oelwein, Iowa, to Invergrove, Minn.; and from Osage, Iowa, to Judge, Minn., and Tripoli and Bremer, Iowa), has been assigned to B. J. DeGroodt, division freight agent at Red Wing, Minn.

T. M. Schumacher, assistant director of traffic of the Southern Pacific, the Union Pacific, the Oregon Railroad & Navigation Company, the Oregon Short Line and the Oregon & Washington, with office at Chicago, has resigned to take charge of the traffic interests of the American Smelting & Refining Company, with office at New York. He will succeed William Sproule, who was recently elected president of the Wells-Fargo Express Company.

J. P. Gehrey, city passenger agent of the Minneapolis, St. Paul & Sault Ste. Marie at Minneapolis, Minn., has been appointed district passenger agent, with office at Duluth, Minn. J. E. Collins succeeds Mr. Gehrey. F. D. Grant has been appointed district passenger agent, with office at Chicago, succeeding C. C. Hill, promoted. P. J. Asselin, traveling agent at Minneapolis, Minn., has been transferred to New York City, and W. B. Lutz succeeds Mr. Asselin.

Engineering and Rolling Stock Officers.

C. J. Stewart, master mechanic of the Central New England, at Hartford, Conn., has been appointed master mechanic of the New York, New Haven & Hartford, with office at Waterbury.

George H. Bussing has been appointed superintendent of motive power of the New Orleans Great Northern, with office at Bogalusa, La., succeeding to the duties of H. W. Burkheimer, master mechanic, resigned.

Curtis Dougherty, engineer maintenance of way of the Alabama Great Southern and the Cincinnati, New Orleans & Texas Pacific, at Cincinnati, Ohio, has been appointed chief engineer of both companies, with office at Cincinnati, and his former position has been abolished.

A. Dinan, division master mechanic of the Atchison, Topeka & Santa Fe at Ft. Madison, Iowa, has been appointed mechanical superintendent of the southern district of the western lines, with office at Amarillo, Tex. He will have jurisdiction over the Pan Handle division and territory from Clovis, Tex., to Belen, but not including shops or roundhouse at Belen. The Albuquerque shops and roundhouse have been transferred from the Coast lines to the northern district of the wetsern lines, and will be under the jurisdiction of M. J. Drury, mechanical superintendent of the northern district at La Junta, Colo., the northern district including the Western, Arkansas River, Colorado, New Mexico and Rio Grande divisions. W. H. Hamilton, division master mechanic at Argentine, Kan., has been transferred to Chanute, Kan., succeeding A. Mitchell, retired. E. E. Machovec, division master mechanic at Newton, Kan., succeeds Mr. Hamilton, and James McDonough, general foreman at Emporia, Kan., succeeds Mr. Machovec.

R. G. Kenly, whose appointment as chief engineer of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn., has been announced in these columns, was born March 13, 1866, at Ritchie Mines, W. Va. He finished his education at Baltimore City College, and began railway work in September, 1885, as a rodman and levelman on surveys and location, with the Annapolis & Baltimore Short Line. He was promoted through the various grades of the engineering department with different roads, and in 1891 became a supervisor of the Norfolk & Western; he was later assistant engineer and then assistant trainmaster of that road, and 1898 was appointed assistant to the chief engineer of the West Virginia Central & Pittsburgh. The next year he went to the Pennsylvania Railroad as draftsman and engineer in charge of construction, and in 1900 became a supervisor, and then a division engineer on the Lehigh Valley. Four years later he was appointed a trainmaster, and in March, 1907, was appointed general superintendent of the Lehigh & New England, with jurisdiction over the operating, mechanical and engineering departments, and for six months from June, 1908, he was engineer of maintenance of way of the Lehigh Valley. He was then made chief engineer of the Minneapolis & St. Louis and the Iowa Central, and when those roads were consolidated with the Chicago & Alton and the Toledo, St. Louis & Western in November, 1909, he became engineer of maintenance of way; now that the managements are separated again, he has been reappointed chief engineer.

R. G. Kenly.

OBITUARY.

F. B. Childs, master mechanic of the Northern Pacific, with office at Spokane, Wash., died at Spokane last week.

Railway Construction.

New Incorporations, Surveys, Etc.

Atchison, Topeka & Santa Fe Coast Lines.—See Atchison, Topeka & Santa Fe.

Atchison, Topeka & Santa Fe.—On the Pecos & Northern Texas track has been laid from Lubbock, Tex., southeast to Coleman, 122.66 miles, and it is expected that an additional 37.54 miles will be finished during 1910. Track has also been laid from Plainview, southeast to Floydada, 14.36 miles, as well as from Slaton, southwest to Lamesa, 54.36 miles. The Gulf, Colorado & Santa Fe expects to finish about 13.80 miles from Lometa to the Colorado river during 1910, track has been laid on a branch from Brady to Melvin, 12.24 miles. The Coast Lines completed work on 5.10 miles from Fullerton, Cal., to Richfield, and the Fresno County Railway, on the Kings river extension, has built 10.28 miles, during 1910.

Baltimore & Ohio.—An officer writes regarding double-tracking work on the Wheeling division that the company is extending the second-track from Valley Falls, W. Va., to Powells, three miles, and from Gaston Junction to Benton Ferry, three miles. The improvements are being made to facilitate the movement of coal to the seaboard from the West Virginia fields. The grading is all light and very little masonry is necessary. The single-track through bridge over the Monongahela river, near Fairmont, will be replaced with a double-track structure. J. F. Brogan, Philadelphia, Pa., has been given the contract for the grading and masonry, and the track work will be carried out by the company's men.

Bangor & Aroostook.—Surveys are now being made for the extension from West Seboois, Me., to St. Francis, 160 miles.

Bangor Railway & Electric Company.—An officer writes that this company has projected an extension from Bangor, Me., to Northern Maine Junction, three miles.

Bingham & Garfield.—Work is now under way by the Utah Construction Company, Ogden, Utah, from Bingham, north to Garfield, 18 miles. H. C. Goodrich, Salt Lake City, may be addressed. (June 3, p. 1390.)

Buckhannon & Northern.—An officer writes that the plans call for a line from the Pennsylvania-West Virginia state line, southwest to Rivesville, W. Va., 32 miles. S. D. Brady, chief engineer, Morgantown. (Feb. 4, p. 230.)

Clarion & East Brady Electric.—A contract has been given to the Ridge Brothers Company, Pittsburgh, Pa., to build from Clarion, Pa., to Reidsburg, six miles. The plans call for a line to connect Clarion, Reidsburg, Curllsville, Sligo, Reinersburg and East Brady. Maximum grades will be 2 per cent., maximum curvature eight degrees. The company will let contracts soon for putting up a power house. F. M. Arnold, president; G. E. Arnold, assistant to president, and F. W. Patterson, chief engineer, Clarion.

Cincinnati, Findlay & Fort Wayne.—An officer writes that this company carried out improvements during 1910 including grade revision work and laying 10.5 miles of second-track between Kirkwood, Ohio and Swanders. The Carter Construction Company were the contractors.

Crittenden Railroad.—This company, which operates 15 miles of railway from Earle, Ark., south to Heth, with a branch from Crittenden to Felco, has projected an extension of five miles.

Duluth, Missabe & Northern.—Work is now under way on a double-track line from Hull Junction, Minn., to Hull Rust mine, 18.11 miles. First track has been laid on 14.40 miles, and second-track on 12 miles. It is expected that all the work will be finished by March, 1911.

El Paso & Southwestern.—This company is making some surveys between Benson, Ariz., and Tucson, but the question of whether the line will be built has not yet been decided. An

officer writes regarding the report that a line is to be built to Yuma, Ariz., or San Diego, Cal., that the company does not contemplate building such a line. (Nov. 19, p. 985.)

FRESNO COUNTY RAILWAY.—See Atchison, Topeka & Santa Fe.

GRAND CANYON, IRON MOUNTAIN & SOUTHERN.—Surveys are said to have been started at Milford, Utah, for this line. The projected route is from Nephi or Payson, through the east side of the Sevier valley, to Fillmore, thence to Kanosh, Beaver City, Cedar City and St. George, and through a pass in the Pine Valley mountains to a point in Arizona, about 225 miles. A branch is to be built to the Kanab forest, along the Utah-Arizona state line. M. H. Walker, Salt Lake City and Senator Reed Smoot are back of the project.

GEORGIA & FLORIDA.—This company has secured control of the Sparks Western, building a 20-mile line from Sparks, Ga., west to Moultrie. About three miles of track remain to be laid to complete the line.

GRAND VALLEY, COLORADO RIVER & SOUTH PACIFIC.—An officer writes that this company has projected a line from Grand Junction, Colo., down the south side of the Colorado river. Henry Barna, president, Brooklyn, N. Y.

GULF, COLORADO & SANTA FE.—See Atchison, Topeka & Santa Fe.

HECLA JUNCTION & BOX CANON.—An officer writes that contracts will be let about April, 1911, to build from Hecla Junction, Colo., on the Denver & Rio Grande, to Granite City, 13 miles. There will be nine trestles or tunnels and some station buildings on the line, which is being built to carry granite from the quarries at Granite City. David Heaton, president and chief engineer, Salida.

HILLSBORO & NORTHEASTERN.—An officer writes that this company has projected a line from Hillsboro, Iowa, to Dubuque, with a number of branches to Lancaster, Wis., and Shullsburg. W. H. H. Cash, president and general manager, New Lisbon, Wis.

HOCKING-SUNDAY CREEK TRACTION.—This company proposes to build an electric line from Nelsonville, Ohio south via Floodwood to Doanville, thence north to Chauncey. The company is securing the right-of-way. About 3.3 miles of track has been laid. The company will put up power houses and a car barn.

KENTUCKY & TENNESSEE RAILWAY.—An officer writes that this company now operates 11 miles of line in Kentucky, and that plans have been made to build an extension for 20 or 30 miles under the name of the Kentucky & Tennessee Railroad, to reach the coal and timber lands owned by the company. The existing line extends from Stearns, Ky., on the Queen & Crescent, southwest through Wayne county, Ky., and is to be extended through Scott and Fentress counties, Tenn. The line will open up a large coal section in the Cumberland mountains heretofore undeveloped, as well as large tracts of timberlands. The company expects to build about five miles during the coming winter and to have all the improvements finished during 1912. Contracts will not be let for the work, as the company's men will carry out the improvements.

KENTUCKY & TENNESSEE RAILROAD.—See Kentucky & Tennessee Railway.

KNOXVILLE, SEVIERVILLE & EASTERN.—This company, which operates 30 miles of line from Knoxville, Tenn., southeast to Sevierville, has made surveys for an extension from Sevierville to Cosby, 30 miles. W. A. Seymour, chief engineer, Knoxville. (July 29, p. 205.)

LOUISIANA SOUTHERN.—An officer writes that this company has projected an extension from Belair, La., southeast to Bohemia, 20 miles.

METHOW VALLEY & WASHINGTON NORTHERN.—An officer writes that this line will extend from Pateros, Wash., at the mouth of Methow river, northwesterly along that river via Methow and Twisp to Winthrop, about 45 miles. Surveys have not yet been made and it is undecided when bids will be asked for the work. W. A. Bollinger, president, Methow, and J. C. Barton, engineer, Twisp. (Nov. 11, p. 941).

MEXICO, SANTA FE & PERRY TRACTION.—An extension of one year has been granted this company by the city of Fulton, Mo., to build an electric line through that place. The plans call for building electric lines to connect Perry, Mexico, Santa Fe, Hereford, Columbia, Fulton and Mokane. The Fruin-Bambrick Construction Company, St. Louis, has charge of the work. M. Crum, president, Mexico. (June 24, p. 1812.)

NATIONAL RAILWAYS OF MEXICO.—The report of this company for the year ended June 30, 1910, shows that the work has been finished by the Brownsville-Matamoros Bridge Company, which was organized in Arizona to build a bridge over the Rio Grande, connecting Matamoros, Mex., with Brownsville, Tex. The St. Louis, Brownsville & Mexico paid for one-half of this improvement, and the National Railways of Mexico paid the other half. Under a contract entered into between the National Railways of Mexico, the state of Durango and the Campania Maderera de la Sierra de Durango, which is covered by a concession from the federal government, a line is being built from Durango, westerly to Llano Grande, about 65 miles. Contracts were let for the work in January. A large amount of bridge improvement work was carried out during the year, as well as improvements made in the districts affected by washouts, necessitating a change of line, raising the grades and putting in permanent steel and masonry. (See report of this company elsewhere in these columns.)

NIAGARA, ST. CATHERINES & TORONTO.—Surveys are being made for an extension from Port Colborne, Ont., to Fort Erie, 18 miles.

PECOS & NORTHERN TEXAS.—See Atchison, Topeka & Santa Fe.

PEORIA & PEKIN UNION.—Improvements are to be made, extending the yards at East Peoria, Ill. The work will be carried out by the company's men.

RANDOLPH & CUMBERLAND.—Work is now under way on an extension from Hallison, N. C., to High Falls, four miles.

ROME & OSCEOLA.—An officer writes that this company is building from Rome, N. Y., north to Osceola, 25 miles. Grading work was finished during 1910 on about five miles. W. P. White, president, Utica.

SAN DIEGO, EL PASO & ST. LOUIS.—This company was organized to build from El Paso, Tex., east via Artesia, N. M., to the Red river, in Texas, about 525 miles. The McCarthy Engineering Corporation, Houston, Tex., has the general contract, and it is expected that the contracts for the work will be let during 1911. There will be some heavy earth and bridge work and six tunnels, aggregating 2.75 miles. A. Courchesne, president, El Paso, Tex., and P. A. McCarthy, chief engineer, Houston.

SEABOARD AIR LINE.—A contract has been given to E. L. Anderson & Co., Dunnellon, Fla., and work is under way on an extension from Fruitville, northwest to Venice, 18 miles. A contract has been given to Kibler, Boswell & Co., Dunnellon, for work from Hernando to Inverness, five miles.

SOUTHERN PACIFIC.—This company's line, between Los Angeles, Cal., and Palms, will be electrified and used as a connecting link between the Los Angeles-Pacific and the Pacific Electric systems, both of which are Southern Pacific properties. The branch will be used mainly for freight traffic.

SPARKS WESTERN.—See Georgia & Florida.

SPRINGFIELD & WESTERN.—An officer writes that preliminary surveys are being made for this line. The projected route is from Springfield, Mo., to Carthage, about 100 miles, with a branch from Paris Springs to Pierce City. H. D. Mackey, president, and M. M. Hollenback, chief engineer, Springfield.

SPRINGFIELD & CENTRAL ILLINOIS TRACTION.—An officer writes that it has not been determined when contracts are to be let for building this line. The projected route is from Springfield, Ill., south via Pawnee, Morrisonville, Hillboro, Coffeen, Greenville, Carlisle and Centralia; another line is to be built from Greenville, west via Alhambra, Edwardsville and Grant City to St.

Louis, Mo., and a third line from Coffeen, Ill., southeast via Vandalia, Kinmundy, Louisville and Olney to Mount Carmel. Isaac A. Smith, president and general manager, Security building, St. Louis, Mo.

Stamford & Eastern.—An officer writes that it has not been decided when bids will be asked for building from Stamford, Tex., via Throckmorton, east to Fort Worth or Dallas. (July 1, p. 54).

Statesville Air Line.—This line is being built from Statesville, N. C., north via Yadkinville, Boonville and Dobson to Mount Airy, about 64 miles. The grading work is being done by state convicts. Maximum grades will be 1.5 per cent., maximum curvature eight degrees. There will be three short steel bridges and five trestles. The line is being built to carry lumber, farm products, manufactured goods and merchandise. W. D. Turner, president, and N. R. Greenlee, chief engineer, Statesville. (April 1, p. 919.)

St. Joseph Valley.—An officer writes that this company is carrying out with its own men work on an extension from Angola, Ind., east for 15 miles.

Sydney & Louisburg.—This company, which operates a line from Sydney, N. S., east to Glace bay, thence south to Louisburg, 39 miles, has work under way from McKiegan's Point to Dixon's Platform, one mile, also on an additional mile from Mile 30 to Mile 31. The latter work is being carried out to replace a section of one mile on the existing line, which will be abandoned. The company proposes to build from Balls creek to Limestone quarries, 2.4 miles, and from Morinin station to Birch Grove coal mines, 2.25 miles. Surveys for this work have been made.

Tuscarora Valley.—An officer writes that this company has projected an extension from Blairs Mills, Pa., to Cherry Run, W. Va., 58 miles.

Vermont Valley.—An officer writes that surveys are being made for a line from Brattleboro, Vt., south to South Vernon, about 10 miles.

Waterloo, Cedar Falls & Northern.—An officer writes that in addition to the line to be built from Cedar Falls, Iowa, southwest to Dike, about 10 miles, that the line from Waterloo west to Cedar Falls, is to be improved to make it a low grade line. It is probable that the contracts will be let and work carried out next spring.

Wichita Falls Route.—Track laying is to be started soon by the Wichita Falls & Northwestern on the extension from Elk City, Okla., north to Hammon, in Roger Mills county, 16 miles.

FOREIGN RAILWAY NOTES.

The amount of produce secured from the new section of the Cape to Cairo Railway recently opened has been a surprise. The freight returns for the first month's working were $50,000. From most parts of the Sudan hitherto served by the railway one or two train loads a week would be considered good. On this new section a train every day has hardly been sufficient to carry down all the stuff, chiefly dhurra (native corn), gum, and cotton. The fourth-class native passenger traffic has produced almost enough to pay the working expenses of the section. This is the first portion of the railway to leave the desert part of the Sudan and break into the edge of the land naturally fertile without artificial irrigation.

A concession has been secured, a preliminary survey made and seven miles of road graded for a railway running from San Pedro de Sula into the hardwood forests of Honduras. The road is an extension of the government railway terminating at San Pedro de Sula, and is being built by Americans, who plan to build saw and planing mills for mahogany timber.

One of the most fertile parts of Hayti is the plain of Leoganes, about 20 miles southwest from Port au Prince. The total area is about 90 square miles. A railway has been planned into this district, with the expectation of providing an outlet for the agriculture products through Port au Prince. About five miles of this road has been built, costing, it is estimated, about $12,000 a mile.

Railway Financial News.

Atlantic Coast Line.—J. R. Kenly, third vice-president, has been elected also a director. This increases the number of members of the board to 12.

Chicago & North Western.—This company has sold to Kuhn, Loeb & Co., New York $15,000,000 4 per cent. general mortgage bonds due 1987. Of the total $165,000,000 authorized general mortgage bonds there were outstanding on June 30 $30,271,000 3½ per cent. bonds, and there were owned by the company and due from the trustee $19,792,000 bonds. The mortgage provides that the interest rate shall not be higher than 5 per cent. Marvin Hughitt, chairman of the board of directors, said to the *Wall Street Journal:* "The bonds were sold to take care of obligations maturing before the first of June for corporate purposes. There are $6,000,000 bonds which must be paid between now and the close of the current fiscal year, and they will be paid off in this manner. None of the proceeds of the sale will be used for construction of new railways, as they are amply provided for."

Cincinnati, Bluffton & Chicago.—The date for the final decision regarding the sale of this property has been set for December 5. A press despatch says that when the sale is ordered, it is understood that $800,000 will be the upset price. The road runs from Buffington to Huntington, Ind., 52 miles.

Detroit, Toledo & Ironton.—A report from Detroit, Mich., says that the receivership will be terminated December 1. What the plans are for a reorganization has not been announced.

Interborough Rapid Transit.—On November 1 the privilege of converting 3-year 6 per cent. notes of 1908-May 1, 1911, into 5 per cent. bonds of 1907 at the rate of 99 in notes for 100 in bonds expired. Of the $21,973,000 notes outstanding, $17,389,000 were exchanged for bonds. This leaves $4,580,000 notes outstanding, and there are now $30,552,000 of the bonds.

Kansas City Terminal.—J. P. Morgan & Co., New York; Lee, Higginson & Co., Boston, and the Illinois Trust & Savings Bank, Chicago, are offering $7,500,000 Kansas City Terminal first mortgage 4 per cent. bonds of 1909-1960 at 97. Of the authorized $50,000,000 bonds there are outstanding, including the bonds now offered, $20,094,000; and reserved to retire 6 per cent. bonds of the Kansas City Belt, due 1916, $2,500,000; and reserved for improvements, $27,406,000. The bonds are guaranteed principal and interest unconditionally by the following roads: A. T. & S. F., C. & A., C. B. & Q., C. G. W., C. M. & St. Paul, C. R. I. & P., Kan. C. S., M. K. & T., Mo. Pac., St. L. & S. F., Union Pac. and Wabash.

Parral & Durango.—A press despatch says that this road has been sold by the Hidalgo Mining Company to a syndicate of Americans, represented by A. J. McQuatters. (See this company in Railway Construction.)

Seaboard Air Line.—Ernst Thalmann and W. K. Wingham have been elected directors, succeeding Y. van den Berg and C. Sidney Shepard.

Washington, Baltimore & Annapolis.—It is understood that the reorganization plan has been drawn up providing for a new company to take over the property after foreclosure sale. The new company, it is said, is to have $7,500,000 first mortgage bonds, $2,500,000 6 per cent. non-cumulative preferred stock and $3,000,000 common stock. Of these authorized securities, $5,000,000 bonds, $1,460,000 preferred stock and the entire amount of common stock are to be issued at once.

Wichita Falls & Northwestern.—Alfred Mestre & Co., New York, are offering a block of first mortgage 5 per cent. bonds of 1909-1939 at 98 to yield 5.15 per cent. on the investment. There are authorized and outstanding $2,300,000 of these bonds, which are secured by a first lien at about $15,000 per mile on the 153 miles of line running from Henrietta, Tex., where it connects with the Missouri, Kansas & Texas, to Elk City, Okla., connecting with the Choctaw, Oklahoma & Gulf.

Supply Trade Section.

The McKeen Motor Car Company, Omaha, Neb., has completed a 70-ft. motor car and a 31-ft. trailer car for the Chicago Great Western. These cars left the company's plant November 14 en route to McIntire, Iowa.

The Edgar Allen American Manganese Steel Company, Chicago, announces the appointment of Walter Brinton as consulting engineer, with headquarters at New Castle, Del. Mr. Brinton was formerly superintendent of the manganese steel department of the Taylor Iron & Steel Company, High Bridge, N. J., a position which he had held since 1895. The Edgar Allen American Manganese Steel Company is now manufacturing manganese steel at Chicago Heights, Ill., and New Castle, Del.

The W. F. Goltra Tie Company, Cleveland, Ohio, has recently been organized to manufacture and sell railway cross ties. The officers are as follows: President and general manager, W. F. Goltra; vice-president, L. C. Mambourg; secretary and treasurer, P. F. Gallagher. Mr. Goltra has been connected with the New York Central lines for 27 years, having held the position of general tie agent during the last three years, from which position he has recently resigned. The company's offices are located in rooms 804 and 806 Rockefeller building, Cleveland.

TRADE PUBLICATIONS

Denver & Rio Grande.—The passenger department of the Denver & Rio Grande has issued a booklet advertising "The Land of Irrigation." It contains 14 photographs of agricultural scenes along the Denver & Rio Grande, a small scale map, and terse, axiomatic sentences regarding the natural resources and possibilities of the Rocky mountain region.

Graphite Products for the Railways.—A booklet has been issued by the Joseph Dixon Crucible Company of Jersey City, N. J., with this title. The object of the book is to bring under one cover all the various products in the Dixon line that are of interest to the various mechanical departments of railways. These include various graphite lubricants, protective paint, crucibles, facings, etc., all of which have been found by actual service to give satisfactory results.

London & Northwestern.—The publications of the London & Northwestern deserve study by the passenger departments of railways in this country. One of its recent tourist books, "Scotland for the Holidays," is an example. This combines several excellencies, each of which may be found separately in various publications in this country, but which are rarely united in a single one. As to form, it is made to slip into a pocket, being 4½ in. by 7 in., and it is printed on heavily coated paper. This latter is partly responsible for the appearance of text and illustrations; but the press work on the half-tones is of a grade rarely found outside of art magazines. There are 130 pages of running comment, concisely written and forming a readable and valuable guide book. Travelers really use such a book—and keep it after they get home.

RAILWAY STRUCTURES.

BENTON, WASH.—The North Coast has let contracts to Harry Boyer, North Yakima, Wash., for building passenger stations at Benton, Wash., and Grand View. The Benton station will be two stories high and the Grand View building one story. Both will be modern in every respect.

CALLAN, TEX.—See Henderson, Tex.

CLARION, PA.—See Clarion & East Brady Electric under Railway Construction.

DALLAS, TEX.—The Houston & Texas Central has let a contract to the Texas Building Company, Fort Worth, Tex., for building a modern fireproof freight depot. The structure will be of reinforced concrete of the most modern type with an exterior finish of brick and stucco. It will be located on Wood street, between Jefferson and Market, on property now owned by the company. The freight warehouse portion of the building will be of one-story construction, approximately 70 ft. x 145 ft., equipped with nine steel rolling doors on each side of the building. The remaining portion of the building will be two stories high, approximately 70 x 55 ft., the first floor containing a parcel freight room, record room, lobby, etc., and the second floor containing the freight offices of the company. Work will be begun at once and pushed to completion as rapidly as possible.

FAIRMONT, W. VA.—See Baltimore & Ohio under Railway Construction.

GERBER, CAL.—The Southern Pacific will build a new round house and yards, and will move the equipment now at Red Bluff to the new plant.

GRAND VIEW, WASH.—See Benton, Wash.

HENDERSON, TEX.—The St. Louis & San Francisco has let contracts for building brick and stone passenger stations at Henderson, Whitehead, Callan and Menard.

MENARD, TEX.—See Henderson, Tex.

MIDLAND, ORE.—The Railroad Commission of Oregon, it is said, has ordered the Southern Pacific to build a combined freight and passenger station at Midland.

WHITEHEAD, TEX.—See Henderson, Tex.

FOREIGN RAILWAY NOTES.

The first -class passenger fare on the Costa Rica railway lines averages three cents per mile, and the maximum freight rate is said to be approximately 13 cents per ton per mile.

Japanese newspapers, in commenting on the $50,000,000 loan to China, made by an American syndicate, both commend and criticise. One paper says: "The loan will no doubt tend to strengthen the position of China greatly, and it is a matter of congratulation that such a loan was placed with Americans. China will be able to build railways throughout the country, which would tend to introduce modern civilization in China." Another says: "News of the loan has stirred the Japanese press to a high pitch, and all kinds of complications are pointed out as the result. They are worrying over the fact that China may appoint an American financier to oversee the monetary affairs of the government."

The Panama Railway is to build for the government of Panama a standard-gage railway, connecting with the Empire in the Canal Zone, and Chorrera, Penonome, Nata, Agua Dulce, and Santiago in the republic of Panama, with a branch line from or near Santa Maria to the town of Pedasi in the Province of Los Santos, and a branch from the foot of the Divide or Cordillera to Anton in the Province of Cocle. The government of Panama will advance the money to the Panama Railroad with which to begin, carry on, and complete the work of construction. The railway company will render monthly statements to the government showing how the money advanced is expended, and the books of the railroad company are subject to investigation at any time by the authorized representatives of the government of Panama.

In the employment of labor the railway company agrees to give preference to natives of Panama when practicable and consistent with efficient service. The contract, which was submitted to the president of the republic for approval, was signed on March 30, 1910, by the secretary of foreign affairs, and the superintendent of the Panama Railroad.

The Panama Railroad has appointed George H. Ruggles to take charge of the surveying forces, and five locating parties have been put in the field. The first installment of $25,000 has been paid to the railway company by the Panama government.

Late News.

The items in this column were received after the classified departments were closed.

The Randolph & Cumberland has ordered a ten-wheel locomotive from the Baldwin Locomotive Works.

The Seaboard Air Line has ordered ten consolidation locomotives from the Baldwin Locomotive Works.

Surveys are being made by the Pittsburg, Shawmut & Northern, from Elk County House, Pa., to Detsch, 4.5 miles. The improvements include building new shops and a gravity yard.

General manager H. Baker of the Cincinnati, New Orleans & Texas Pacific has asked for bids on five 110-ton Pacific type passenger locomotives and ten 100-ton consolidation locomotives.

The Pacific & Idaho Northern is laying track on an extension from Lamotah, Idaho, to New Meadows, eight miles. Maney Brothers Company, Ogden, Utah, are the contractors. Surveys are being made for a further extension from New Meadows to Long Valley, 35 miles.

The Interstate Commerce Commission has suspended proposed advances in coal rates on the Baltimore & Ohio and allied roads which were to have taken effect December 16. The suspension is to March 15, 1911, pending an investigation for reasonableness. Eight other roads are named as party defendants to the suspension.

The following railway companies are in the market for rails: The Pennsylvania, the New York Central & Hudson River, the New York, New Haven & Hartford, the Delaware, Lackawanna & Western, the Chicago, Burlington & Quincy, the Chicago, Milwaukee & St. Paul and the Lehigh Valley. It is said that the Pennsylvania Railroad will order for 1911 delivery about 135,000 tons, and the New York Central Lines over 100,000 tons.

The Illinois Railroad and Warehouse Commission, which has held a hearing on the reasonableness of coal rates in the state of Illinois, has ruled that some advance in the rates should be allowed. The auditors of the railways presented complete figures showing their records of the cost of hauling coal. A final ruling is to be made next Monday, after submitting the railways' figures to all the roads interested and to the Illinois Manufacturers' Association.

The Illinois Traction system has placed a contract for automatic block signals, style B, made by the Union Switch & Signal Company, Swissvale, Pa., for complete signaling on its lines from Mackinaw Junction east to Peoria, and from Mackinaw Junction south; also between Carlinville and Staunton, six miles west to Danville. The new St. Louis bridge of the company will be completely equipped with automatic block signals. In all, 75 miles of road will be equipped with automatic block signals, to be installed immediately. The company proposes to continue installing signals until it completes signaling the entire system of 500 miles.

Bids were received recently for work on three additional barge canal contracts. The contracts and lowest bidders are: Contract 27—A, for the completion of certain work on contract 27 at Fort Edward, Holler and Shepard, Rochester, for $449,498, as against the state engineer's estimate of $409,455. Contract 37, largely dredging work in the Oswego river, between Fulton and Oswego, American Pipe & Construction Company, Philadelphia, $2,323,998, as against the state engineer's estimate of $1,992,220. Contract 82, construction of a new highway bridge superstructure over the canal west of the Genesee river in Rochester, Groton Bridge Company, Groton, $28,841, as against the state engineer's estimate of $27,235.

Officials of the St. Louis & San Francisco confirm the fact that B. F. Yoakum, chairman of the board, and B. L. Winchell, president of the St. Louis & San Francisco, arrived in St. Louis Monday over the Chicago & Eastern Illinois, and were accompanied on the inspection trip by A. J. Earling, president of the St. Paul, and Percy A. Rockefeller, a director. The party is continuing the inspection of the 'Frisco lines throughout the Southwest. Officers, however, are non-committal as to the significance of the trip. A New York director of the St. Louis & San Francisco says he has not heard anything regarding an alliance of any sort between the St. Paul and 'Frisco. According to a rumor Mr. Yoakum is desirous of having the St. Louis & San Francisco enter into a traffic agreement with the Chicago, Milwaukee & St. Paul Railway Company, whereby the last mentioned company will divert all its traffic from the West bound for Southern ports to the 'Frisco. Naturally in turn the 'Frisco would give all its business destined to Northwestern to the St. Paul.

At the hearing in Washington last Tuesday in the freight rate increase case before the Interstate Commerce Commission several men representing the big furniture industries at Grand Rapids testified concerning the probable effect on their business of the proposed increases. Being cross-questioned they said that their appearance was at the suggestion of George W. Perkins, of the firm of J. P. Morgan & Co. The witnesses said that while they opposed pending advances, they would not object to a general increase of rates throughout the country. W. H. Gay testified that $8,000,000 was invested in the 45 furniture factories at Grand Rapids, whose annual sales aggregated $12,000,000. Stewart Foote, of Grand Rapids, also testified that Mr. Perkins had suggested his appearance. Mr. Foote said that the consumers and not the shippers would pay the increase. Mr. Gay said that the suggestion from Mr. Perkins had been made at an accidental meeting in Washington a month ago. Mr. Perkins had explained that the witnesses for the railways had been one-sided, and that he did not like it, as he was just as much interested in manufacturing and producing as in the railways.

The sum total of the testimony of the furniture people was that they were opposed to the present advance because it discriminated against them, leaving lower and more favorable rates to furniture people at other points where the rates have not been advanced.

C. J. Bertschy, of Milwaukee, traffic manager of the Schlitz Brewing Company, testified that the advances would result in $172,510 of additional expense to them. Asked as to how closely his company was affiliated with the Union Transit Company, Mr. Bertschy said the Schlitz concern had no financial interest in the refrigerating company, but that it "simply had a call on their cars."

The Appellate Court of Indiana has rendered a decision upholding the right of an electric railway to parallel a steam railway and operate its high voltage alternating current system even though it interferes with and renders useless the telegraph and telephone lines of the steam road. The suit was brought in the Elkhart Circuit Court by the Lake Shore & Michigan Southern against the Lake Shore and South Bend Electric to enjoin the latter from operating its high voltage system. The trial court denied injunctive relief, and the plaintiff appealed.

The appellant based its right of relief upon a line of early decisions that "one who for his own purpose brings upon his land and conducts and keeps thereon things likely to do mischief, if it escapes, is *prima facie* answerable for all the damage which is the natural consequence of its escape." The complaint also alleges that the appellate operated its high voltage system without installing necessary devices for minimizing the induction of the electric current, to the damage of the appellee, and was to that extent a nuisance.

The Appellate Court held that the electric company was making lawful use of the franchise conferred upon it by the state in a manner contemplated by the statute, and that such act cannot be considered a nuisance in itself; that in the exercise of such franchise no negligence has been shown nor any wanton or unnecessary disregard of the rights of the complaining company, and that the damages occasioned are not the direct consequence of the construction of the electric road, but are incidental result of its operation and not recoverable. The Court further said, "that no suggestion is offered as to the character or success of these devices and appliances calculated to prevent induction or whether they are in general successful use, nor is anything said in the way of approximating the cost to the appellee of their adoption; nor does it appear but that the appellant (steam road) might, by some inexpensive method, have prevented the annoyance to which it is now subjected. For these reasons the judgment of the trial court in denying injunctive relief is affirmed.

Equipment and Supplies.

CAR BUILDING.

The Carolina, Clinchfield & Ohio has ordered 1,000 50-ton steel hopper cars.

The New York Central & Hudson River is in the market for 1,000 box cars and 110 refrigerator cars.

The Boston Elevated has ordered 50 semi-combustible cars from the Laconia Car Company. This item is not confirmed.

The New York Despatch Refrigerator Line has ordered 300 thirty-ton refrigerator cars from the Whipple Car Company.

MACHINERY AND TOOLS.

The Chicago, Rock Island & Pacific is taking bids on a few machine tools, but it is not definitely known how many will be ordered.

The San Diego Electric Railway, of San Diego, Cal., has placed an order with the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., for two 1,000,-k.w., 600-volt, 514-r.p.m. generators, to be driven by Westinghouse-Parsons low pressure steam turbines running at 3,600 r.p.m. The generators and turbines will be connected through Melville-McAlpine reduction gears. In addition to this equipment the Westinghouse company will shortly ship one 1,200-k.w., 600-volt, 80-r.p.m. engine type direct current generator to the same company.

IRON AND STEEL.

The Erie has ordered 400 tons of structural steel from the American Bridge Company.

The New York, New Haven & Hartford is in the market for about 200 tons of bridge steel.

The St. Louis & Southwestern is said to be in the market for 4,800 tons of heavy section rails.

The Boston Elevated is in the market for 4,500 to 5,000 tons of structural steel for extensions.

The Boston & Maine has ordered 150 tons of bridge steel from the Phoenix Bridge Company.

The Bessemer & Lake Erie has ordered 350 tons of structural steel from the American Bridge Company.

The Philadelphia & Reading is in the market for car floats, which will require about 900 tons of steel plates.

The Kansas City, Mexico & Orient has ordered 8,000 tons of rails from the United States Steel Corporation.

The Chicago, Milwaukee & St. Paul has ordered 240 tons of structural steel from the American Bridge Company.

The Louisville & Nashville has ordered 29,000 tons of O. H. rails from the Tennessee Coal, Iron & Railroad Company.

The Grand Trunk has ordered 100 tons of steel for a bridge over the Erie Canal, at Buffalo, from the American Bridge Company.

The Norfolk & Western has ordered 30,000 tons of rails, the order being equally divided between the Carnegie Steel Company and Pennsylvania Steel Company.

The Pennsylvania Railroad is in the market for two small bridges, requiring about 150 tons of steel, and is said to be in the market for 300 tons of steel for a bridge in Baltimore and one in Delaware.

General Conditions in Steel.—There have been no important developments in the steel market this week. The large roads have as yet made no announcement as to their rail requirements for 1911.

Acme Culverts in South America.

The Canton Culvert Company, of Canton, Ohio, recently sold a large order of its corrugated metal culverts to Brazil. Although the shipment containing several carloads of 4, 5 and 6-ft. diameter culverts left New York by boat October 15, it is not expected that it will reach its destination until some time next spring. A representative of the railway in connection with which these culverts are to be used said: "We are buying your large size nestable culverts for use along our railway in place of other style small bridges or culverts. It is a serious proposition to transport bridge work or anything that cannot be shipped in small and light sections, and the country is so flat that no large bridges are required. By using 'Acme' culverts we can get them to their destination, section by section, if necessary, much earlier than anything else which would serve our purposes with equal assurances of permanent service. These culverts must be transported inland by river, on small houseboats, a great distance. If they reach their destination by next April we shall be satisfied. We calculate that our laborers, who, as you may imagine, are not any too intelligent, can easily set them up. We import most of our men and have some trouble in keeping them." The Canton Culvert Company states that its "Acme" nestable culverts are being used abroad in large quantities in Brazil, Peru, Argentina, Colombia, Philippines, Santo Domingo, Cuba, Japan, Sudan, India and other ports of the world.

The Randall Graphite Sheet Lubricator.

The lubricating value of graphite has long been recognized, but it has not been extensively used for journal bearings of railway rolling stock on account of the difficulties in applying it. This relates to the trouble found in getting the graphite to the right place and keeping it there by the usual method of mixing graphite and oil. Oil lubrication is based on the theory of a separation of the journal and the bearing surfaces by a thin oil film, and its success depends on a continuous flow of oil. When this ceases the metals are in contact, and there are undue friction, rapid wear and hot bearings. The large brass melting furnaces used by railways, and the great number of car bearings made per day by every large railway, is striking evidence of the extent to which car bearings are worn out, and all this wear means the consumption of power and fuel to overcome its resistance. Soft bearings have less tendency to heat and cut under deficient oil supply, and the combination of soft metal and graphite in a stable form would appear to be the ideal arrangement for car and locomotive bearings.

In the Randall graphite sheet lubricator this desirable combination has been effected. It is made of small cones of solid graphite about ¼ in. in diameter and ⅜ in. long, molded on thin copper netting. This is placed in the bearing shell and the babbitt or soft metal is cast around it so that the ends of the cones are flush with the bearing surface of the filled bearing.

Besides the large saving in wear of journals and bearings, and in the power consumed in overcoming the friction due to wear, there is also a considerable saving in oil, amounting to about 90 per cent., due to the use of the graphite sheet lubricator. It is only necessary to use the original application of oil in sponging the box; a further use of oil is unnecessary, as the graphite supplies a constant and effective lubricant. It is believed that the use of oil at any time is unnecessary when the graphite sheet lubricator is applied, and further experience may demonstrate this to be true.

These statements may be surprising to many mechanical officers, but they have been sustained by actual service on a number of prominent roads during the past year. The Southern Pacific began using the sheet graphite lubricator in October, 1907, on the trailers of heavy passenger locomotives on the line between Portland and San Francisco—a portion of the line where it is difficult to avoid hot bearings. They have been so successful that all heavy passenger engines on that line are now fitted with the Randall bearings in the front engine trucks, as well as on the trailing trucks. The Burlington has also used this material in trailing trucks of heavy passenger engines with success and satisfaction. They are, however, making a larger use of it for car bearings, and have placed in service 1,000 car bearings with the Randall graphite sheet lubricator in them. One hundred of these bearings are in service under the special observation of the test department, which is making a careful investigation of their economy. Another of the important Western railways has been experimenting with the graphite sheet lubricator, and has found it especially useful in trying service in the bearings of trailing trucks of Pacific type locomotives. Where these have given trouble from hot boxes nearly every day, when lubricated in the ordinary way, the Randall graphite lubricator has been running three months without any trouble from hot bearings. This lubricator is made by the Strong, Carlisle & Hammond Company, Cleveland, Ohio.

ANNUAL REPORT

FERROCARRILES NACIONALES DE MEXICO—SECOND ANNUAL REPORT.

(NATIONAL RAILWAYS OF MEXICO.)

MEXICO OFFICE:
PRIMERA CALLE DE VERAGA, 209.

NEW YORK OFFICE:
No. 25 BROAD STREET.

To the Stockholders:

In compliance with the provisions of Article 48 of the By-Laws of the Company, the Board of Directors has the honor to present to the stockholders the report of operations for the fiscal year ended June 30, 1910.

EXECUTION OF AND COMPLIANCE WITH THE BANKERS' AGREEMENT OF FEBRUARY 29, 1908.

The Bankers' Agreement of February 29, 1908, has been complied with in all respects, both in regard to the receipt of the certificates of stock of the former Mexican Central Railway Company Limited and the former National Railroad Company of Mexico, called for conversion, and in relation to the distribution of the stocks and bonds of the Ferrocarriles Nacionales de México (National Railways of Mexico).

The shares and bonds of the former Mexican Central Railway Company Limited and the former National Railroad Company of Mexico have continued to be presented for conversion, and at June 30th of this year the number and proportion of these certificates exchanged for those of this Company is shown in the following statement:

Statement of Securities Deposited up to the 30th of June, 1910, in accordance with the plan of the 6th of April, 1908.

SECURITIES OF THE MEXICAN CENTRAL RAILWAY COMPANY LIMITED.

	Total Issue.	Deposited.	Per Cent.	Out-standing.	Per Cent.
Ten Per Cent. Notes.....	$500	.....	0.00	$500	100.00
Five Per Ct. Priority Bds.	6,597,000	$5,192,000	78.70	1,405,000	21.30
First Mortgage Bonds...	264,062	225,715	85.48	38,347	14.52
Consolidated Mtg. Bonds.	109,020,000	105,359,000	96.64	3,661,000	3.36
First Income Bonds.....	32,706,000	32,329,100	98.84	376,900	1.16
Registered Income Bonds.	325,200	314,000	96.55	11,200	3.45
Second Income Bonds...	11,284,000	11,254,000	99.74	30,000	.26
Shares	59,127,100	59,038,900	99.85	88,200	.15
Total	$219,323,862	$213,712,715	97.44	$5,611,147	2.56

SECURITIES OF THE NATIONAL RAILROAD COMPANY OF MEXICO.

	Total Issue.	Deposited.	Per Cent.	Out-standing.	Per Cent.
Preferred Stock	$32,000,000	$31,997,300	99.99	$2,700	0.01
Second Preferred Stock..	22,043,600	22,002,600	99.81	41,000	0.19
Common Stock	284,600	147,500	51.83	137,100	48.17
Deferred Stock	11,021,800	11,021,800	100.00	.....	0.00
Total	$65,350,000	$65,169,200	99.73	$180,800	0.27

TOTAL NUMBER OF SECURITIES OF BOTH COMPANIES.

	Issued.	Deposited.	Per Cent.	Out-standing.	Per Cent.
Bonds and Shares.....	$284,673,862	$278,881,915	97.97	$5,791,947	2.03

All the above amounts in United States Currency.

The remaining Five Per Cent. Gold Notes of the former Mexican Central Railway Company Limited, to which reference was made in the annual report last year, and which were assumed by your Company together with other obligations of that Company, have been paid in full, and the Equipment Bonds and Notes of the said former Mexican Central Railway Company Limited are being paid as they mature.

There remains pending payment, therefore, of the obligations referred to only the amount shown in the attached General Balance Sheet, or $4,708,000, as compared with $37,046,238.72 at June 30, 1909.

In order to give greater scope to the certificates of this Company on the market, the First and Second Preferred Shares have been listed on Exchanges in Basle, Geneva and Zurich, Switzerland, and the Prior Lien Bonds have been listed on the Exchanges in Berlin and Frankfort, Germany. In connection with these listings the Company has only assumed the obligation to communicate and publish in due time advertisements relative to the payment of dividends and interest, redemption of bonds, etc. The listing of the Second Preferred Shares on the Paris Bourse has also been accomplished.

ACQUISITION OF RAILWAY LINES.

Subsidiary Companies.

By the purchase from the Southern Pacific Company of a considerable number of shares of The Mexican International Railroad Company, the Ferrocarriles Nacionales de México (National Railways of Mexico) became the owner of 203,023 of the total 207,082 shares comprising the Capital Stock issued by that Company, and this permitted the execution of the deed transferring all of the properties of The Mexican International Railroad Company to the Ferrocarriles Nacionales de México (National Railways of Mexico); which transfer took effect as of date June 30, 1910.

Your Company being the only holder of the stock of the Mexican Pacific Railway Company, it was deemed convenient, in order to simplify the administration of said Railway, to transfer all of the properties of that Company to the Ferrocarriles Nacionales de México (National Railways of Mexico); this was done, the transfer being effected as of June 30th, last.

The two deeds of transfer mentioned above were executed in New York City in due legal form, and as the transfers had previously been authorized by the Department of Communications and Public Works the documents were protocolized in the City of Mexico, on the register books of Notary Juan M. Villela.

The Board of Directors entered into negotiations for the acquisition of all or at least a large majority of the shares of stock of the Pan-American Railroad Company and the Veracruz & Isthmus Railroad, considering that these lines had great significance in connection with the future development of this Company, and although the contracts covering these acquisitions were executed after June 30th of this year and do not, therefore, properly pertain to the period covered by this report, the Board of Directors deem it expedient to inform the Stockholders of this fact, though only in general terms, on account of the corresponding deeds not having as yet been executed.

It would be deemed proper to observe, with respect to these contracts, that, in all probability, according to careful studies which have been made of the physical and financial conditons of the lines referred to, the earnings of these railroads will in the near future be sufficient to fully cover the expenses of operation as well as the fixed charges.

The Interoceanic Railway Company of Mexico (Acapulco to Veracruz) Limited, which as the Stockholders understand, is operated by this Company, entered into a contract with the Mexican Southern Railway Company, covering the rental of the latter Company's properties for the balance of the time covered by its concession, and inasmuch as the concessions of the Interoceanic Railway will expire before those of the Mexican Southern Railway, it is stipulated in said contract that, after the expiraton of the former Company's concessions, the rental contract will continue in favor of the Ferrocarriles Nacionales de México (National Railways of Mexico). The rental stipulated is the equivalent of the amount necessary to cover the payment of the principal and interest of the bonds issued by the Mexican Southern Railway Company, and to reimburse the Capital Stock, paying thereon progressive dividends not to exceed at any time 5 per cent. per annum. The receipts to date from the Mexican Southern Railway assure the payment of these amounts in the near future, and will soon yield considerable profit directly to the Interoceanic Railway, and indirectly to the Ferrocarriles Nacionales de México (National Railways of Mexico).

It does not appear necessary to say more concerning the great advantages offered by the acquisition of the only railroad that connects the State of Oaxaca with our System.

This Company is the owner of the concession issued by the Federal Government to the National Railroad Company of Mexico for the construction of a bridge over that part of the Rio Grande belonging to this country, to connect the towns of Matamoros, State of Tamaulipas, and Brownsville, State of Texas, and the St. Louis, Brownsville & Mexico Railway is the owner of the concession issued by the Government of the United States of America for the construction of that part of the bridge located in the State of Texas, and these Companies agreed to the organization of a subsidiary company to which they will transfer the concessions and facilities on both sides of the river and which subsidiary company shall take charge of the construction and operation of said bridge. The result of this agreement was the organization of the Brownsville-Matamoros Bridge Company, under the laws of the Territory of Arizona, and the concessions referred to will be transferred to that Company in due course, with the authority granted by the Governments of Mexico and the United States of America. The Capital Stock of the Bridge Company was subscribed in equal parts by both Railway Companies.

It was considered advantageous to reorganize the Express Service over the Company's lines, which had previously been performed by Wells Fargo & Company on the former Mexican Central Railway, and by the National Express Company on the lines of the former National Railroad Company of Mexico. The result of the negotiations entered into with this end in view was that this Company and Wells Fargo & Company organized a limited company in accordance with the laws of the Republic of Mexico, under the name of the "Compañía Méxicana de Express, S. A.", the object of which was to perform express service in the Republic of Mexico. The organization having been perfected, the said company executed with the Ferrocarriles Nacionales de México (National Railways of Mexico) a contract covering the operation of express service on its system, and by virtue of this contract your Company and the lines which it operates, in their capacity of transportation companies, receive as compensation for providing the facilities necessary for the performance of the service, 50 per cent. of the gross earnings that may be received on the entire System, the balance going to the Compania Méxicana de Express, S. A. Furthermore, the Capital Stock of the Express Company, totally paid in cash by Wells Fargo & Company, was fixed at one million pesos in the Deed of Incorporation, represented by ten thousand shares of one hundred pesos each, which were divided into two series, A and B, of five thousand shares each, Series A shares being assigned to this Company, free from all expense, as compensation for our having agreed to the organization of the Express Company. It was also provided in the Deed of Incorporation that out of the gross earnings of the Compania Méxicana de Express, S. A., on the lines of the Ferrocarriles Nacionales de México (National Railways of Mexico) a cumulative dividend of 9 per cent. should be set aside for a period of five years, which would be assigned, preferably, to shares of the A series. In view of this and in accordance with contract entered into with the Ferrocarriles Nacionales de México (National Railways of Mexico), in its capacity as a transportation company, as already stated, your Company should receive 59 per cent. of the gross earnings mentioned. The B series shares are also entitled to 9 per cent. cumulative for a period of five years, but subordinate to the 9 per cent. corresponding to shares of the A series. Any balance left over, after providing for the Reserve and Sinking Funds, is to be divided *pro rata* between the two series of shares.

As a matter of information and in view of its importance the Board desires to advise the stockholders that the gross Express receipts of the Compania Méxicana de Express, S. A., on the lines of your Company for the first ten months of its operation (September 1, 1909, to June 30, 1910), amounted to $2,542,982.10 Mexican Currency, out of which the Company, as a transportation company, is entitled to 50 per cent., or $1,271,491.05 Mexican Currency, and on account of dividends declared on the Capital Stock of the Compania Méxicana de Express, S. A., A Series, $278,868.37 Mexican Currency, making a total of $1,550,359.42 Mexican Currency.

As the Stockholders are aware, the Mexican Central Railway Company Limited was the only stockholder in several subsidiary companies which

it had organized, and some of these companies owned exclusively certain railway lines or had charge of the operation of certain other lines. When the transfer of the Mexican Central Railway and subsidiary companies to the Ferrocarriles Nacionales de México (National Railways of Mexico) had been consummated, it was considered undesirable that these companies should continue in existence, as their continuance would not only cause difficulties in the accounting in connection therewith but also unnecessary expense. Existing under these circumstances were the following: "The Tampico Short Line Company" and "The Mexican & Northern Steamship Company," which have been dissolved in accordance with the laws of the respective States of the United States of America, under which they were organized.

For the same reason, and in view of the close relationship which existed between the Alamo Coal Company and Coahuila Coal Company, it was deemed desirable to consolidate these two companies, and to that end a company named "The Coahuila Consolidated Coal Company," was organized under the laws of the State of Colorado, the corporate documents of which company were duly protocolized in the City of Mexico, it having acquired all the properties, rights, etc., of the two companies mentioned above.

THE BOARD OF DIRECTORS.

The Board of Directors has proceeded regularly, not only in such matters as pertain exclusively to the Directors resident in Mexico, but also in those concerning which, in accordance with the By-Laws, it became necessary to obtain the vote of the Local Board resident in New York, the relations with which have been wholly satisfactory and in perfect accord.

It is with much regret that the Board has to inform the Stockholders of the loss sustained by the death of Mr. Julio M. Limantour, which occurred on October 11, 1909. Mr. Martin G. Ribon, by designation of the Board, was elected to fill the vacancy caused by Mr. Limantour's death.

During the year Messrs. Ernst Thalmann, James Speyer, Manuel de Zamacona é Inclán and Samuel M. Felton resigned as Directors, and in accordance with the provisions of Article Twenty-six of the By-Laws the Board appointed Messrs. Walter T. Rosen, Hans Winterfeldt, Emilio Pardo and Hugo Scherer, Jr., respectively, to act in their stead until the holding of the General Meeting of Shareholders at which this report is presented.

In accordance with the provisions of Clause 14 of the Deed of Incorporation of the Company, the term of the first group of the three into which the Board of Directors is divided having expired, which is composed of Messrs. Luis Elguero, Ricardo Honey, William H. Nichols, José Signoret, Walter T. Rosen (substitute of Mr. Ernst Thalmann), James N. Wallace and Emilio Pardo (substitute of Mr. Manuel de Zamacona é Inclán); seven Directors should be elected at the General Meeting, to hold office until the meeting of 1911, and in addition two to fill the unexpired term of Messrs. Samuel M. Felton and Julio M. Limantour, to hold office until the meeting of 1912. The outgoing Directors may be re-elected.

The Commissaries, Messrs. Luis Mendez and Salvador M. Cancino, and their substitutes, Messrs. Emilio Pardo and Porfirio Diaz, Jr., appointed at the Ordinary General Meeting, shall cease to exercise their functions on the date of the present General Meeting of Shareholders.

In accordance with Article 27, of the By-Laws, the Board of Directors elected Mr. Jose Y. Limantour as Chairman of the Board and Mr. Pablo Macedo as Vice-Chairman. In view of the fact that the same conditions extended during the past year with Mr. Limantour as in the one preceding, that is to say he still held the office of Minister of Finance and Public Credit, he asked to be excused from asuming the duties of Chairman, and Mr. Pablo Macedo, in his capacity of Vice-Chairman, therefore discharged the duties of Chairman.

OPERATION OF THE LINES.

The administration of the Company's affairs and the operation of its lines have been carried on without interruption during the fiscal year 1909-1910, and it is with great satisfaction that the Board informs the Stockholders of the gratifying results achieved, notwithstanding our having suffered, as was but natural, from the effects of the general loss of crops throughout the Republic and the financial depression experienced during the year 1908.

These results appear in the Accounts and Balance Sheet submitted to the Annual Meeting, as well as in the report rendered by the President of the Company to the Board of Directors, and which accompanies this report. Reference to the President's report and accompanying statements will give full details regarding the operation of the property.

As the Stockholders were informed by the Board at the General Meeting of 1909, the exceptionally heavy rains in the northern part of the Republic during the month of August, 1909, caused serious damage to that portion of the system located in the region mentioned. Immediate steps were taken to do the necesary work to open the line and in a comparatively short time the damage was not only temporarily repaired but some permanent work had been done which materially improved the condition of portions of the Road. This meant a very heavy expenditure for the Company, which, in round numbers, amounts to $3,282,300 Mexican Currency.

During the early part of the year under review the conductors and engineers of foreign nationality tried to induce the Company to adopt certain rules and conditions which would tend to give them rights over natives occupying similar positions, threatening to strike if their demands were not granted. The Board of Directors worked energetically and by exercising necesary prudence was able to handle the situation in such a way as not only to satisfy the conductors and engineers mentioned, but to uphold the principle of giving preference to the Mexican employees under equal circumstances; this in accordance with the regulation in effect that foreign employees who properly performed their duties would be kept in the service, thus recognizing their personal merits; the understanding being that, under equal conditions, pereference would be given to native employees with a view to stimulating the native element, so that in course of time the Company would be able to use native employees in its service as far as possible. The Board of Directors, through the Press, made known all the details of this incident, and, no doubt, these are known to the Stockholders.

ACCOUNTS AND DIVIDENDS.

Embodied in the report to the Stockholders will be found the Balance Sheet and Income Account corresponding to the fiscal year 1909-1910, which show the financial condition of the Company as of June 30, 1910, and which have been duly audited by Messrs. Price, Waterhouse & Company, Chartered Accountants, and approved by the Commissaries.

As the Stockholders will note by said Balance Sheet and Income Account, the results obtained permitted the payment of a 1 per cent. dividend on First Preferred Shares for the second half of the year 1909, and of 2 per cent. for the first half of 1910, making a total dividend of 3 per cent., which exceeded by 1 per cent. the dividend guaranteed on this stock by the Deed of Incorporation of the Company. Now, if the Stockholders approve the proposition which the Board of Directors preent to them, to the effect that an additional dividend of 1 per cent. be declared, the First Preferred Shares will receive the full dividend of 4 per cent. to which they are entitled in accordance with the Statutes of the Company, notwithstanding the fact that the past year is only the second of the existence of the company.

The details given in this report embody the most important occurrences during the fiscal year under review and the books containing minutes of meetings of the Board of Directors and of the Executive Committee, as well as the documents pertaining thereto, are at the disposal of the Stockholders, should they desire to refer to them or secure any information not made mention of in this report, which I have the honor to submit in the name of the Board of Directors.

PABLO MACEDO,
Vice-Chairman.

Mexico, D. F., October 5, 1910.

MEXICO, D. F., September 22, 1910.

LIC. PABLO MACEDO,
Vice-Chairman of the Board:

Dear Sir:

I beg to submit to your Board of Directors report of operations of the property for the fiscal year ended June 30, 1910.

RESULTS OF OPERATION.

The following condensed statement of Income Account shows the results of the year:

		Mexican Currency.
The Gross Earnings from all sources were		$52,562,293.39
The total Expenses of Operation were		31,593,557.78
Leaving Net Earnings of		$20,968,735.61
To which add:		
Interest on Securities owned		1,165,742.28
Other Receipts		22,793.87
Making		$22,157,271.76
From which deduct:		
Taxes and Rentals	$413,067.77	
Operating Deficits of Subsidiary Companies (Mexican-American Steamship Co. and Texas Mexican Railway Co.)	76,238.55	
	$489,306.32	
Sundry Adjustments of Operating Expenses:		
Material Adjustment Account	$50,000.00	
Reserve on Additions and Betterments in Suspense	61,652.08	
Reserve for accrued Depreciation on Equipment covered by the Prior Lien and General Mortgages	980,000.00	
*Reserve to repair Damages caused by Floods in Monterey District	1,000,000.00	
	2,091,652.08	
		2,580,958.40
		$19,576,313.36
And:		
Interest on Funded Debt and Equipment and Collateral Trusts, etc.		16,739,743.78
Leaving Balance carried to Profit and Loss Account		$2,836,569.58
And deducting:		
Five per cent. of Net Profits transferred to Reserve Fund	$141,828.47	
Dividend on Preferred Shares, three per cent.	1,729,974.00	
		1,871,802.47
Leaving as Net Surplus for the year ended June 30, 1910		$964,767.11
To which add:		
Net Surplus for year ended June 30, 1909		50,469.89
Which gives a total Net Surplus at June 30, 1910, of		$1,015,237.00

*On account of the extent of damage done by the floods in and about Monterey during the month of August, 1909, it has been decided to create this reserve fund to take care of the heavy expenditures which we will have to incur in order to restore our lines in the affected district to standard.

MILEAGE.

The following table gives details of mileage in operation at June 30, 1910:

Main Line and Branches:

STANDARD GAUGE.

	Kilometers.	Miles.
México (Santiago) to center of Rio Grande Bridge	1,290.684	801.998
Colonia to Junction with Main Line at Kilo 6	5.791	3.598
Cintura Line—Santiago to San Lázaro	5.089	3.162
Connection at González Junction	0.054	0.034
González to Acámbaro	84.256	52.354
Branch in Yard at Acámbaro	0.950	0.590

	Kilometers.	Miles.
San Juan Junction to Jaral del Valle	80.067	49.752
Connection with the "Y" at Salamanca	0.936	0.581
Matehuala Branch, including Potrero Branch	65.212	40.521
San Luis de la Paz Branch	59.995	37.280
Matamoros Branch	331.078	205.723
Cintura Extension—San Lázaro to Xico; and Branch to Factories	5.183	3.221
Jarita Branch	30.800	19.139
Mexico (Buena Vista) to Ciudad Juárez	1,970.340	1,224.320
Tampico to Monterey and Gómez Palacio	882.100	548.115
Chicalote to Tampico	652.678	405.558
Irapuato to Guadalajara	259.100	160.998
Guadalajara to Ameca	89.900	55.861
Guadalajara to Manzanillo	356.052	221.242
Torreón to Saltillo	307.694	191.193
México (Buena Vista) to Balsas	292.480	181.740
Jiménez to Rosario	153.895	95.626
Lechería to Apulco	141.200	87.738
Yurécuaro to Los Reyes	138.248	85.904
Paredón to Saltillo	73.763	45.834
Tula to Pachuca	70.200	43.621
La Vega to San Marcos	47.000	29.205
San Bartolo to Rio Verde	42.356	26.319
Tepenacasco to Honey	35.162	21.849
Ocotlán to Atotonilco	34.922	21.700
Silao to Guanajuato	23.600	14.664
Mexican Union Ry.—Rincón de Ramos to Cobre (Leased Line)	17.070	10.607
Telles to Pachuca	16.753	10.410
Brittingham to Dinamita	10.240	6.363
Tampico to La Barra	10.810	6.717
Cintura Ry. of the City of México	9.572	5.948
Adrian to Santa Barbara	8.363	5.197
San Luis Potosí to Hacienda de Beneficio	8.350	5.189
Kilo. 1228 to Sulphur Mine	5.245	3.259
Santiago Branch—México to the Customs House	1.930	1.199
Total, Standard Gauge	7,619.118	4,734.329

NARROW GAUGE.

Tacuba Junction (Kilo. 6) to Uruápan and Extension to Packing House "Popo"	511.899	318.081
Michoacán & Pacific Railway (Leased Line)	91.917	57.115
Peralvillo to Beristáin	164.200	102.030
San Agustín to Irolo	28.200	17.523
Ventoquipa to Tortugas	26.500	16.466
Tepa to Pachuca	25.900	16.094
Total, Narrow Gauge	848.616	527.309
Total, Main Line and Branches	8,467.734	5,261.638
Sidings and Yards:		
On Main Lines (between México and New Laredo and México and Ciudad Juárez), including México City Terminals	512.067	318.186
On Branch Lines	479.408	297.892
Hidalgo Division	30.657	19.049
Total, Sidings and Yards	1,022.132	635.127
GRAND TOTAL	9,489.866	5,896.765

The decreased mileage of sidings and yards, as compared with last year, is accounted for by a re-measurement of the ex-Mexican Central property during the fiscal year under review, and which developed this difference.

	Kilometers, Standard Gauge.	Miles, Standard Gauge.
Texas Mexican Railway	260.475	161.853
	Kilometers, Narrow Gauge.	Miles, Narrow Gauge.
Tulancingo Tramway	3.781	2.349
Relinas—Decauville:		
To Los Reyes	9.650	
To Salinas	6.054	
	15.704	9.758

Average Length of Line Operated:

The average length of line operated during the year was 8,467.734 kilometers, or 5,261.638 miles.

WEIGHT OF RAILS.

The following table shows the weight of rails in the main line and branches, also sidings and yards, at June 30, 1910:

Main Line and Branches:

	Kilometers.	Miles.
85 lb. rail	546.741	339.731
83 lb. "	30.382	18.879
75 lb. "	1,629.373	1,012.452
70 lb. "	1,549.305	962.699
66 lb. "	298.578	185.529
66½ lb. "	12.520	7.780
60 lb. rail	419.187	260.472
56 lb. "	2,787.010	1,731.778
45 lb. "	669.360	415.923
40 lb. "	499.608	310.444
Various "	25.670	15.951
Total, Main Line and Branches	8,467.734	5,261.638

Sidings and Yards:

85 lb. rail	8.595	5.341
83 lb. "	1.922	1.194
75 lb. "	11.855	7.366
70 lb. "	66.372	41.242
66 lb. "	8.493	5.277
60 lb. "	2.830	1.759
56 lb. "	629.057	390.880
54 lb. "	3.169	1.969
45 lb. "	122.251	75.964
40 lb. "	163.780	101.769
30 lb. "	3.808	2.366
Total, Sidings and Yards	1,022.132	635.127
GRAND TOTAL	9,489.866	5,896.765

GROSS EARNINGS.

The total Gross Earnings from all sources amounted to $52,562,293.39, Mexican Currency, for details of which, as well as comparison with last year, your attention is called to the following table:

1908-1909. Earnings.	1908-1909. Percentage.		1909-1910. Earnings.	1909-1910. Percentage.
$34,968,578.03	71.65	Commercial Freight	$37,668,711.38	71.66
103,733.74	.21	Construction Freight	202,652.70	.39
10,365,724.23	21.24	Passenger	11,245,560.16	21.39
130,214.95	.27	Baggage	207,160.68	.39
1,879,617.15	3.85	Express	1,769,049.99	3.37
38,472.82	.08	Telegraph	46,014.50	.09
134,793.31	.28	Rentals	101,365.25	.19
8,678.89	.02	Floating Equipment	8,186.34	.02
1,175,709.14	2.40	Miscellaneous	1,313,592.39	2.50
$48,805,522.26	100.00		$52,562,293.39	100.00

The percentage of each class of commercial freight to the total handled during the year, and comparison with the previous year, is shown in the following table:

1908-1909. Percentage.		1909-1910. Percentage.
10.04	Forest Products	12.34
23.43	Agricultural Products	23.24
3.41	Live Stock and Animal Products	3.48
52.41	Mineral Products	48.87
10.71	General Merchandise	12.07
100.00		100.00

The foregoing table shows a very satisfactory increase in Gross Earnings for the year, and the increases in earnings from commercial freight and passenger traffic are most gratifying, when it is taken into consideration that the country has been recovering from the effects of a financial crisis. Also, the fact should not be lost sight of that on account of the floods in the Monterey district in August, 1909, the lines in this district were not only closed for quite a time, which prevented us from moving freight and passengers, but the farmers suffered to a great extent in the loss of crops, cattle, etc.

OPERATING EXPENSES.

Diligence and care have been exercised in the maintenance of the property, and at the close of the fiscal year the physical condition might be considered as good, and somewhat improved during the year.

On account of the heavy floods in the Monterey district, and consequent extensive washouts, Operating Expenses were charged during the year with approximately $870,000.00 Mexican Currency, being the cost of repairing the line temporarily to open it for traffic, together with such permanent repairs as were made during the period under review. There is also included in Operating Expenses the extra cost of detouring freight and passenger trains to and from points affected by these interruptions and which, in some instances, meant a haul of considerable additional mileage.

The cost of operating the property for the fiscal year was 60.11 per cent.

The comparative percentages of the sub-accounts for the years 1908-1909 and 1909-1910 are as follows:

1908-1909. Percentage.		1909-1910. Percentage.
22.54	Maintenance of Way and Structures	26.14
21.23	Maintenance of Equipment	20.38
49.61	Conducting Transportation	47.59
6.62	General Expenses	5.89
100.00		100.00

The comparative percentages to Gross Earnings for the years 1908-1909 and 1909-1910 being:

1908-1909. Percentage.		1909-1910. Percentage.
13.47	Maintenance of Way and Structures	15.71
12.69	Maintenance of Equipment	12.25
29.65	Conducting Transportation	28.61
3.95	General Expenses	3.54
59.76		60.11

STATEMENTS OF OPERATION.

The various statements of accounts as prepared by the General Auditor, and which accompany this report, give in detail the results for the year, and show the financial condition of the property.

The books and accounts have been audited by Messrs. Price, Waterhouse & Co., of London, New York and México, and a copy of their certificate as to the correctness thereof accompanies this report.

The results of operation for the year are as follows:

1908-1909. Mexican Currency.		1909-1910. Mexican Currency.	Percentage of Increase or Dec.
$48,805,522.26	Gross Earnings	$52,562,293.39	
29,166,879.30	Operating Expenses	31,593,557.78	
$19,638,642.96	Net Earnings	$20,968,735.61	
	Which, reduced to *gold* at the average price of the Mexican dollar for the year, viz., 50 cents,		
$9,819,321.48	equals	$10,484,367.80	Inc. 0.35
59.76	Operating percentage	60.11	
16,914,927	Kilometers run by revenue trains.	17,164,988	" 1.48
$2.8853	Gross Earnings per revenue train kilometer	$3.0621	" 6.13
1.7243	Operating Expenses per revenue train kilometer	1.8405	" 6.74
1.1610	Net Earnings per revenue train kilometer	1.2216	" 5.23
5,801.81	Gross Earnings per kilometer of road operated	6,207.36	" 6.99
3,467.25	Operating Expenses per kilometer of road operated	3,731.05	" 7.61
2,334.56	Net Earnings per kilometer of road operated	2,476.31	" 6.07
6.12627	Average amount received for each ton of freight	6.59474	" 7.65
.01766	Average receipts per ton per kilometer	.01851	" 4.81
1.65477	Average amount received from each passenger	1.85195	" 11.92
.01790	Average receipts per passenger per kilometer	.01813	" 1.28

Expressed in miles the figures show as follows:

1908-1909. Mexican Currency.		1909-1910. Mexican Currency.	Percentage of Increase or Dec.
10,510,428	Miles run by revenue trains	10,665,809	Inc. 1.48
$4.6435	Gross Earnings per revenue train mile.	$4.9281	" 6.13
2.7750	Operating Expenses per revenue train mile	2.9621	" 6.74
1.8685	Net Earnings per revenue train mile..	1.9660	" 5.23
9,337.13	Gross Earnings per mile of road operated	9,989.80	" 6.99
5,580.01	Operating Expenses per mile of road operated	6,004.55	" 7.61
3,757.12	Net Earnings per mile of road operated	3,985.25	" 6.07
6.12627	Average amount received for each ton of freight	6.59474	" 7.65
.02841	Average receipts per ton per mile.....	.02978	" 4.81
1.65477	Average amount received from each passenger	1.85195	" 11.92
.02881	Average receipts per passenger per mile	.02918	" 1.28

ADDITIONS AND BETTERMENTS.

By referring to the Balance Sheet it will be noted that there is a total amount of $4,290,918.94, Mexican Currency, standing to the debit of Additions and Betterments at June 30, 1910, of which amount the sum of $1,779,501.52, Mexican Currency, pertains to expenditures made up to June 30, 1909; the balance, or $2,511,417.42, covers amounts expended during the year ended June 30, 1910. From the appended statement it will be seen that of the latter amount $99,756.22 were expended on freight and passenger equipment and on converting locomotives from coal to oil burning; the balance, or $2,411,661.20, on extraordinary work of a capital nature.

The following statement gives details of amounts expended on this account during the year ended June 30, 1910:

		Expended July 1, 1909, to June 30, 1910.
Right of Way and Station Grounds		$46,277.99
Real Estate		1,474.76
Protection to Banks, and Drainage		4,777.25
Grade Reductions and Changes of Line		261,190.96
Tunnel Improvements		24,398.20
Bridges, Trestles and Culverts		392,328.17
Increased Weight of Rail		587,028.79
Ballast		500,636.25
Sidings and Spur Tracks		84,801.76
Terminal Yards		56,477.51
Improvements or Crossings Over and Under Grade		15,639.87
Interlocking Apparatus		2,190.45
Telegraph and Telephone Lines		23,546.32
Station Buildings and Fixtures		46,203.61
Roadway Buildings		4,774.86
Shops, Engine-houses and Turntables		60,278.19
Shop Machinery and Tools		86,528.83
Water and Fuel Stations		53,095.23
Dock and Wharf Property		13,167.67
Electric and Power Plants		2,949.06
Additional Equipment:		
Locomotives	$53,304.96	
Passenger Coaches	25,000.00	
Freight Cars	2,378.00	
Work Equipment	19,073.26	
		99,756.22
Colombia Branch		40.62
Sundry Betterment Expenditures pending Formal Authorization		143,854.85
Total		$2,511,417.42

Ballast:

The following quantities of ballast have been placed in the track during the year, viz.:

Divisions.	Lineal Meters.
México—Querétaro	27,093
Guadalajara	58,027
San Luis	45,132
Monterey	56,424
Torreón	1,622
Chihuahua	54,587
Aguascalientes	21,407
Cárdenas	18,745
Hidalgo	985
Total	284,022

BRIDGES, TRESTLES AND CULVERTS.

The following permanent bridges were built during the year:

Northern Division:

Two 38.1 meters deck steel spans on masonry; Bridge 958-A near Mariposa.

Aguascalientes Division:

At Encarnación an 8 meter masonry arch culvert with 9 meter side walls has been constructed to replace the viaduct; this work embraced a 130,000 cubic meter fill, changing line to one curve of 2 m. 30° in place of three curves of seven degrees each.

Guadalajara Division:

Irapuato to Guadalajara. Two 62.4 meters through steel truss bridges, Nos. 93-A and 150-A, at La Piedad and La Barca, respectively.

Gomez Palacio Division:

Two pairs of 4.87 meters steel, I beams on masonry abutments; Bridges 908-A and 986-A, Main Line.

Two 45.7 meters steel, double span on masonry abutments and pier; Bridge 1,093-B; Main Line (Picardias Bridge).

Chihuahua Division:

Three spans of 7.01 meters, and two spans of 3.9 meter steel, I beams; Bridge 1,610-A; Main Line, over street car subway.

Linares District:

Ten spans of 7.01 meters steel, I beams on masonry; comprising three bridges, Nos. 456-A, 457- and 465-B; located at kilometers 455.93, 456.30 and 465.55, respectively.

Zamora Branch:

One pair of 7.01 meters steel, I beam spans on masonry abutments; Bridge 38-B.

Pacific Division—Narrow Gauge:

Two spans of 5.18 meters steel, I beams on masonry; bridge 357-K; Morelia district, near Charo.

RELAYING WITH HEAVIER RAIL.

The following sections of track were laid with heavier rail during the year, viz.:

Mexico Terminals:

Buena Vista yard: 1.097 kilometers of 27.779 kilograms (per lineal meter)—56 lbs. per yard) rail laid in place of 19.842 kilograms (40 lb.). Santa Julia: 411 meters of 19.842 kilograms (40 lb.) replaced with 313 meters of 34.723 kilograms (70 lb.) rail, and 98 meters of 27.779 kilograms (56 lb.) rail.

Mexico—Queretaro Division.

From kilometers 123.389 to 312.438, difference of 189.049 kilometers, and from kilometers 5.377 to 95.000 difference 89.623 kilometers, a total of 278.672 kilometers of 34.723 kilograms (70 lb.) rail replaced with 42.390 kilograms (85 lb.) rail.

San Luis Division:

Matehuala Branch: from kilometers 34.700 to 47.000, or 12.300 kilometers of 22.322 kilograms (45 lb.) rail were replaced with 34.723 kilograms (70 lb.) rail.

In Matehuala yard, 1.859 kilometers of 19.842 kilograms (40 lb.) rail were replaced with 780 meters of 34.723 kilograms (70 lb.) rail and 1.079 kilograms of 22.322 kilograms (45 lb.) rail. Morales Smelter Branch; San Luis Potosi; 7 kilometers of 19.842 kilograms (40 lb.) rail replaced with 27.779 kilograms (56 lb.) rail.

Northern Division:

Matamoros Branch: There were 38.820 kilometers of 22.322 kilograms (45 lb.) rail and 19.842 kilograms (40 lb.) rail taken up and relaid with 27.779 kilograms (56 lb.) rail, as follows:

Kilometers.		Rail Taken Up		Rail Laid.
From	To	22.322 kgs.	19.842 kgs.	27.779 kgs.
79.440	86.440	7.000	....	7.000
88.500	92.500	4.000	....	4.000
107.300	107.900	.600	....	.600
112.000	112.600	.600	....	.600
128.900	129.350	....	.450	.450
131.700	132.020	....	.320	.320
203.950	205.050	....	1.100	1.100
275.700	279.600	....	3.900	3.900
307.150	328.000	....	20.850	20.850
Totals		12.200	26.620	38.820

Monterey Division:

From kilometers 16.400 to 21.000, or 4.600 kilometers, and from kilometers 26.273 to 60.100, or 33.287 kilometers, total, 38.427 kilometers of 27.779 kilograms (56 lb.) rail replaced with 34.723 kilograms (70 lb.) rail. From kilometers 581.000 to 593.520 or 12.520 kilometers of 27.779 kilograms (56 lb.) rail replaced with 30.507 kilograms (61½ lbs.) rail. From kilometers 593.520 to 594.500, or 980 meters of 27.779 kilograms (56 lb. rail replaced with 37.204 kilograms (75 lb.) rail.

Guadalajara Division:

Irapuato to La Junta: Between kilometers 0.861 and 251.168 there were 205.535 kilometers of 34.723 kilograms (70 lb.) rail laid in place of 27.779 kilograms (56 lb.) rail, leaving some small gaps at switches still to be changed.

Aguascalientes Division:

From kilometers 735.034 to 735.838, or 804 meters of 32.739 kilograms (66 lb.) rail replaced with 37.204 kilograms (75 lb.) rail.

Cardenas Division:

From kilometers 438.462 to 457.069, or 18.607 kilometers of 37.204 kilograms (75 lb.) rail replaced with 42.390 kilograms (85 lb.) rail.

Chihuahua Division:

From kilometers 1734.422 to 1778.600, or 44.178 kilometers of 27.779 kilograms (56 lb.) rail replaced with 37.204 kilograms (75 lb.) rail.

NEW SIDE AND PASSING TRACKS.

During the year new side tracks, passing tracks, cross-overs and extensions to existing side tracks were built to the extent of 19.820 kilometers. Of these new tracks, 19.428 kilometers are of standard gauge, and the balance, or 392 meters, of narrow gauge. The following statement gives details of weight of rail used in these new tracks, viz.:

		Kilometers.
Forty pound rail (19.842 kilograms)		.097
Forty-five pound rail (22.322 kilograms)		3.233
Fifty-six pound rail (27.779 kilograms)		16.005
Seventy pound rail (34.723 kilograms)		2,361
Seventy-five pound rail (37.204 kilograms)		.201
Eighty-five pound rail (42.390 kilograms)		.172
Total		22.069
From which deduct:—		
Tracks taken up:		
Forty pound rail (19.842 kilograms)	1.365	
Fifty-six pound rail (27.779 kilograms)	.884	
		2.249
Net increase		19.820

FLOODS IN MONTEREY DISTRICT.

With reference to remarks under head of "Damages Suffered by the Lines" in your report of last year, an approximate estimate of the total damage places the amount at $3,282,300.00, Mexican Currency, as necessary to repair the damage, improve the districts affected by the washout by changes of line, raising grades and putting in permanent steel and masonry. Of this amount it is estimated that a sum of $1,332,900.00, Mexican Curency, will be chargeable to Additions and Betterments, and the balance, or $1,949,400.00, represents the approximate cost of replacing previous structures. It is thought that the charge of $870,000.00 Mexican Currency, to Operating Expenses, and the reserve of $1,000,000.00, Mexican Currency, which has been set up in the accounts for the year under review, will take care of all the work to be done under this head and which is chargeable to operation.

IN GENERAL.

Employees:

The number of employees in the service of the company at the close of the fiscal year was 26,106. Of the total number, 1.075, or 4.12 per cent., were foreigners.

Statements of Equipment:

Your attention is invited to statements showing various classes of locomotives and cars on hand at June 30, 1910, and which accompany this report.

New Equipment:

The increase in the traffic over the system made necessary the purchase of additional rolling stock, and, with the approval of the Board of Directors, orders were placed in the months of January, March, April and July, 1910, for the following:

13 Mallet Compound Locomotives.
46 Passenger Coaches.
2,550 Freight Cars.

The first deliveries of this new equipment will begin during the last quarter of the present calendar year.

Matamoros—Brownsville Bridge:

This bridge, to which reference was made in the last Annual Report, was completed and opened for traffic on July 21, 1910.

Operation of Express Department:

Under a contract executed between this Company and the Compañia Mexicana de Express, S. A., the latter assumed control and operation of the express service on all of our lines as of September 1, 1909, and for a period of twenty-five years from that date. The results from operation for the ten months to June 30, 1910, have been satisfactory.

New Line from Durango to Llano Grande:

Under contract executed January 4, 1909, between this Company, the State of Durango and the Compañia Maderera de la Sierra de Durango, and covered by a concession from the Federal Government, we are to build a line from Durango in a westerly direction for a distance of approximately 105 kilometers to a point called Llano Grande. The State of Durango and the Compañia Maderera guarantees for a period of twenty years any deficit from operations sufficient to pay the interest on cost of the line. Contracts for construction of the line were let in the month of January, 1910, and the work is progressing satisfactorily.

Transfer of The Mexican International Railroad Company.

The physical transfer of all the lines, property, etc., of The Mexican International Railroad Company to Ferrocarriles Nacionales de México having become effective on June 30, 1910, all of the assets and liabilities of that company have been included in the General Balance Sheet of this company, and which forms a part of and accompanies this report.

As in former years, a separate report of the operations, etc., of The Mexican International Railroad Company will be rendered for the fiscal year ended June 30, 1910.

Tree Planting:

The work of planting trees on the various divisions of the system has received considerable attention during the last year; at most points the experiment has been a success, and in a few cases it has been ascertained that in certain districts the soil, climate, etc., are unsuitable for certain kinds of trees. To further this work a nursery has been established at La Barra, a short distance out from Tampico, on company's land, and many young trees are being shipped to suitable points on the system for planting.

Stocking Streams, etc., with Fish:

The Industrial Department has been endeavoring to stock the principal lakes, running streams and larger presas along the lines with game fish of various kinds, and at some places the fish have been supplied.

Artesian Wells:

At various points on the system new artesian wells have been sunk, and at some places existing wells have been deepened, with a view to improving the water service.

Statements of Accounts:

Attached hereto you will please find letter from the General Auditor, dated September 13, 1910, together with the ten statements of accounts as listed therein.

Accompanying this report will be found a list of directors and officers of your company as at June 30, 1910.

Respectfully submitted,

E. N. BROWN,
President.